Artificial Immunity
1895

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Noviciæ Indicæ IX. *Some additional* Papaveraceæ.—*By* D. Prain.

[Read August, 7th]

The account of this natural order in the *Flora of British India* (i 116-119) was published 23 years ago (May 1872) Since that date a number of forms new to the Indian area have been communicated to the Calcutta Herbarium from the various frontiers of the Empire. Some of these require to be added to the Indian Flora, not because they were unknown when the first volume of the *Flora of British India* was published—a few of them as a matter of fact are included in the *Flora Indica* published by Drs. Hooker and Thomson in 1855, which included in its purview the area beyond the north-west frontier comprising Beluchistan and Afghanistan that is excluded from the scope of the later work—but owing to extension of Indian territory towards the north-west during the past quarter of a century. In the present paper it is proposed to provide diagnoses of those forms in as nearly as may be the style of the diagnoses in the *Flora of British India*; to obviate the possibility of confusion between the forms now described and those given in the *Flora*, keys have been prepared showing the relationships of *all* the Indian species in each genus.

To assure himself of the probable validity of the species here proposed as new, and of the accuracy of the nomenclature of those previously described, the writer has compared examples of each with the material of the order contained in a number of European collections. He has also had the advantage of the use of the material in Herb. Saharanpur kindly placed at his disposal by Mr. Duthie, that in Herb. Zürich kindly lent by his friend Prof. Schinz and that in the private collection of Mr. C. B. Clarke kindly lent by its owner. For facilities in consulting the public Herbaria at Kew, the British Museum, Paris and Geneva, the writer has to thank Mr. Dyer, Mr. Carruthers, M. Ed. Bureau, and Dr. J. Mueller respectively; while for permission to study the material in their magnificent private collections, he is deeply indebted to M. Casimir de Candolle and M. Barbey-Boissier of Geneva, and to M. Drake del Castillo of Paris. And for assistance and advice most ungrudgingly given during his study of these Indian species, the writer would wish to thank many friends, but more especially M. Casimir de Can-
ea Geneva; M. Ad. Franchet, Paris; Dr. Batalin, St. Petersburg;
have urgn.-Captn. Cummins, Army Medical Staff.

as P.

Sik e limitation of genera, at all times a subject of discussion, is particularly perplexing among Thalamifloral orders; the difficulties that beset the student of *Papaveraceæ* in particular are many and great. A complete review of these difficulties could only be appropriate in a revision of the order as a whole. Still even in a partial and more or less cursory review like the present, it is impossible to avoid an allusion to some of them; a brief note is therefore added to the systematic account of each genus.

PAPAVERACEÆ.

Key to the Indian genera (including those newly reported).

* Capsulses opening by short valves or pores :—
  † Stigmas radiating on a sessile disc; (sepals 2, petals 4) 1. PAPAVER.
  † † Stigmas at the top of a distinct style :—
    ‡ Stigmas discrete above, patent; sepals 3, petals 6,... 2. ARGEMONE.
    ‡ ‡ Stigmas concrete throughout, decurrent; sepals 2, petals 4 in 2 pairs, or 5–9 in an imbricate spiral 3. MECONOPSIS.
* * Capsules dehiscing throughout their length; (sepals 2, petals 4) :—
  † Stigmas sessile :—
    ‡ Stigmas radiating; valves 3-4, rarely 2; fruit without dissepiment ... ... 4. ROEMERIA.
    ‡ ‡ Stigmas prolonged as 2 horizontal arms; fruit with a pseudo-replum in which the seeds are partially embedded ... ... 5. GLAUCIUM.
  † † Stigmas at the top of a distinct style :—
    ‡ Stigmas concrete throughout, valves 3–6 ... 6. CATHCARTIA.
    ‡ ‡ Stigmas discrete above, valves 2 ... ... 7. CHELIDONIUM.

1. (1.) PAPAVER LINN.

Key to the Indian species (incorporating the new forms).

* Perennial; scapes simple leafless; flowers orange-yellow; (filaments subulate; capsule hispid; whole plant hirsute) ... ... 1. *P. nudicaule.*
* * Annuals; stems branching leafy; flowers scarlet, purple or pink :—
  † Stem-leaves not amplexicaul; plants usually hispid :—
    ‡ Capsules hispid; leaves 2-3-pinnatifid; (flowers scarlet with dark purple eye) :—
      § Sepals obtuse: filaments dilated upwards ... 2. *P. hybridum.*
      § § Sepals with horn-like subapical processes; filaments filiform ... ... 3. *P. pavoninum.*
    ‡ ‡ Capsules glabrous; leaves 1-2-pinnatifid; (filaments filiform) :—
      § Capsules subglobose stalked; lobes of disc overlapping ... ... 4. *P. Rha*
      § § Capsules oblong sessile; lobes of disc distinct :—
        ¶ Lobes of disc plane and separated by shallow sinuses ... ... 5. *P. dubium.*
        ¶ ¶ Lobes of disc strongly ridged and separated by deep divisions (disc stellate) ... 6. *P. turbinatum.*

† † Stem leaves clasping; plants glabrous and glaucous; (capsules glabrous):—
  ‡ Capsules obovate-oblong, sessile; filaments subulate; small plants 6–12 in. high ... ... 7. *P. Decaisnei.*
  ‡ ‡ Capsules globose, stalked; filaments dilated upwards; tall plants 2–4 feet high ... ... 8. *P. somniferum.*

The genus *Papaver* is hardly an Indian one; *P. somniferum* is only known as a cultivated plant while, except in a cultivated form, *P. Rhœas* is hardly known in India. *P. hybridum* is a species widespread in the Mediterranean and Oriental regions; *P. pavoninum, P. turbinatum, P. Decaisnei* are three species common in the Orient (Asia Minor, Syria, Persia, Afghanistan and Beluchistan): all four species are therefore Indian only because, along its extreme north-west border, the Indian Empire includes a fringe of their natural geographical area. Of the remaining two the Alpine species, *P. nudicaule*, occurs only in the Hindu-Kush and Karakoram and is thus not even truly Himalayan, while the temperate species *P. dubium* is a mere corn-field weed. Even that is limited to the North-West Himalaya, where it occurs in a form which extends from Southern Russia through all the intermediate countries to the area indicated.

1. (1.) PAPAVER NUDICAULE *Linn. Sp. Pl.* ed. i., i. 507 (1753).

VAR. rubro-aurantiacum *Fisch.* ex *DC. Syst. Veg.* ii. 70 (1821); *Sims, Bot. Mag.* t. 2344 (1822); *DC. Prodr.* i., 118 (1824). P. croceum *Ledeb., Flor. Altaic.* ii. 271 (1830). P. alpinum VAR. croceum *Fisch. & Mey. Ind. Sem.* iii, 44 (1837); *Ledeb., Flor. Ross.* i., 87 (1842). P. nudicaule VAR. croceum *Elkan, Monogr. Papav.* 17 (1839); *Walp. Rep.* i. 111 (1842). P. nudicaule *H. f. & T., Flor. Ind.* 249 (1855) *Boiss. Flor. Orient.* i. 107 (1867); *H. f. & T. Flor. Brit. Ind.* i. 117 (1872).

All the Indian wild specimens are referable to this particular variety which has orange-yellow flowers, dark coloured hairs on the scapes and dark-coloured setæ on the capsules. The geographical area of this variety extends from Afghanistan, Northern Kashmir and Western Tibet, through Soongaria and along the Altai range to Mongolia and Northern China.

A remarkably fine cultivated form of this plant is to be found in gardens in South-Eastern Tibet and in the Chumbi valley. The flowers are sometimes over 3 inches in diam. and though occasionally yellow, are usually dark purple and look very much like those of *P. Rhœas.* Some of the Tibet specimens are partially double-flowered: these were collected in the province of Tsang and communicated to Calcutta by the Lama Ujyen Gyatsko. The Chumbi specimens were obtained by one of Dr. King's Lepcha collectors. It is somewhat remarkable that we have never yet succeeded in obtaining seeds of this plant which might be known as P. *nudicaule* VAR. *grandiflora.* Apparently it does not occur in gardens in Sikkim.

2. (2.) PAPAVER HYBRIDUM *Linn.*

3. (—.) PAPAVER PAVONINUM *Schrenk* ex *Fisch. & Mey.* in *Enum. Pl. nov Schrenk* 64 (1842); leaves pinnatipartite, segments oblong-

linear incised-dentate sparingly hispid, filaments filiform, sepals hirsute *with a dorsal conical process under the tip;* capsule ovate setose aculeate, stigma convex rays 4–6. *O. A. Mey.* in *Ind. Sem.* ix. 35, 82 (1843); *Bunge, Rel. Bot. Lehm.* 16 (1847); *Stscheg. Bull Soc. Mosc.* (1854) i., 151; *Trautv. Bull. Soc. Mosc.* (1860) i. 91; *Regel & Herder, Bull. Soc. Mosc.* (1866) iii. 90; *Boiss. Flor. Orient.* i. 116 (1867); *Osten-Sacken & Rupr. Sert. Tianschan.* 38 (1869); *Regel & Herder, Bull. Soc. Mosc.* (1870) ii. 248. P. hybridum *Kar. & Kir. Bull. Soc. Mosc.* (1842) i. 141 *non Linn.* P. cornigerum *Stocks, Lond. Journ. Bot.* iv. 142 (1852): *H. f. & T. Flor. Ind.* 250 (1855); *Walp. Ann.* iv. 173 (1857).

PANJAB: Peshawar, *Vicary! Stewart!* SCINDE: *Stocks!* BRITISH BELUCHISTAN: near Quetta, *Sanders! Duke! Lace! Duthie! Appleton!* DISTRIB. Throughout Beluchistan, Afghanistan, Turkestan and Soongaria.

Annual, stems slender sparingly branched; leaves, flowers and habit very like those of *P. hybridum*; the capsules however are smaller while the horned sepals and the filiform filaments at once easily distinguish it.

4. (3.) PAPAVER RHŒAS *Linn. Sp. Pl.* ed. i., i. 507 (1753).

VAR. *typica*; stigmatic rays 8–12.

This is an extremely rare plant in India; the only undoubted specimens the writer has seen were collected by Sir D. Brandis in Chamba, Panjab Himalaya (*Brandis* n 4336!). Some specimens that may also be referable to genuine *P. Rhœas* were collected in Kashmir by Dr. T. Thomson. These, however, in spite of the smaller number of their stigmatic rays, look more like a reversion to type, after "escape," of the following variety, than like the European plant.

VAR. *latifolia*; stigmatic rays 12–20. Papaver Rhœas VAR. latifolia *Ham. Mss.* in *Wall. Cat.* n. 8119 (1830). P. Hookeri *Baker* in *Bot. Mag.* cix. t. 6729 (1883). The SHIRLEY POPPY: *Journ. of Horticult.* (1886) p. 367, f. 55.

Cultivated in Indian gardens from SCINDE, *Stocks!* to the NORTH-WEST PROVINCES, *Royle! Falconer! Thomson! King!* and LOWER BENGAL, *Hamilton! Hooker!*

Annual, branched, 3–4 ft. high, covered with spreading hispid hairs; *stem* as thick as little finger at base, branches erect and ascending, flowering copiously; *flowers* 2–4 in. across; petals in unequal pairs, crenulate, pale rose to bright crimson, base wedge-shaped with diffused white to blue-black spot; *capsule* ½–¾ in. diam., shortly stalked, crenations of disk rounded overlapping.

From this description, which applies to the cultivated plant, it will be seen that there is hardly room for doubt that we have here to deal with only a form of *P. Rhœas*. The distinguishing *botanical* feature is the larger number of stigmatic rays; on the strength of this character Mr. Baker has proposed specific rank for the plant. This it certainly does not deserve and from the existence of a very intermediate state in Kashmir it is doubtful if its separation even as a variety is altogether valid. It is however very easy, even in the Herbarium, to distinguish this plant from cultivated forms of *P. Rhœas* proper introduced from Europe which grow with a luxuriance that equals that of VAR. *latifolia* itself. The form seems to have originated in Indian gardens and is supposed to have only recently been introduced to European culture. This is however not quite exact, for the Poppy now known as the Shirley Poppy, which seems to be undoubtedly the Indian *P. Rhœas* VAR. *latifolia*, has been in continuous cultivation in Scotland for over half a century.

Occasional references in Indian writings to the presence of *P Rhœas* must be discounted In the majority of cases *P. dubium*, not infrequently *P. turbinatum*, is the species intended; the idea having become prevalent that the plant which is really *P. Decaisnei* is *P. dubium*, not unnaturally the casual observer supposes that what is really *P. dubium* must be *P. Rhœas*.*

5. (4.) PAPAVER DUBIUM *Linn. Sp. Pl.* ed. i., ii. 1196 (1753.).

VAR. glabrum *Koch, Syn.* 30 (1837). P. dubium VAR. lævigatum *Elkan. Monogr. Papav.* 25 (1839); *H. f. & T. Flor. Ind.* 250 (1855); *Walp. Ann* iv. 176 (1857). P. lævigatum *M. Bieb. Flor. Taur. Cauc.* iii. *Suppl.* 364 (1819); *DC. Syst. Veg.* ii. 78 (1821); *Prodr.* i. 119 (1824); *Spreng. Syst.* ii. 569 (1825); *Reichb. Pl. Crit.* iv. 41. t. 533 (1826); *C. A. Mey. Verzeichn. Pfl. Cauc.* 175 (1831); *Boiss. Flor. Orient.* i. 114 (1867). P. glabellum *Stev.* ex *DC. Syst. Veg.* ii. 78 (1821). P. glabrum *Royle. Ill.* 67 (1839).

All the Indian specimens of *P. dubium* are referable to this variety which is distinguishable from the type only by being subglabrous with the few setæ on the scape, the lower surface of the leaves and the sepals, adpressed. In South-Eastern Europe intermediate forms connecting this with true *P dubium* are plentiful; no such connecting forms and no examples of true *P. dubium* occur in India. The geographical area of this variety extends from Southern Russia, the Caucasus and Georgia through Eastern Asia Minor, Armenia and Persia to Northern Beluchistan, Afganistan and the North-West Himalaya as far eastward as Garhwal. The figure by Reichenbach quoted above (*Pl. Crit.* 533) is made from Bieberstein's original examples collected near Odessa; that figured under the same name by the same author in *Flor. German.* t 4478 b. is not this plant.

6. (—.) PAPAVER TURBINATUM *DC. Syst. Veg.* ii. 84 (1821); leaves 1–2-pinnatisect, filaments filiform, capsule elliptic-oblong glabrous, stigma 6–10-rayed crenations of disc deeply cut, widely separated and ridged. *DC. Prodr.* i. 120 (1824); *Boiss. Flor. Orient.* i. 144 (1867). P. macrostomum *Boiss. & Huet.* in *Sched. Pl. Huet.* (1855); *Boiss.*,

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* In a circular regarding sheets missing from the Wallichian type Herbarium which is preserved in the rooms of the Linnean Society of London n. 8119 is noted as being there unrepresented. This is a mistake; the specimen is present and in good condition; it has been overlooked owing to its having been inadvertently glued down along with n. 8120.

Flor. Orient. i. 115 (1867). P. Rhœas *Wall. Cat.* n. 8120 (1830) *nec Linn.* P. Rhœas? *H. f. & T. Flor. Ind.* 251 (1855).

KASHMIR: common, *Falconer! Thomson! Aitchison!* at Romoo, 6000 feet, *Clarke* n. 28543! at Srinagar, 5300 feet, *G. Gammie!* cultivated or an escape. BENGAL: cultivated, *Hamilton!* DISTRIB. Yarkand, Afghanistan, Persia and Armenia.

Annual, branched, 1–2 ft, scapes with adpressed hairs; leaves, habit and general appearance of *P. dubium* VAR. *glabrum* (*P. lævigatum* M. Bieb.) and of *P. Rhœas* VAR *commutatum* (*P. commutatum* Fisch. and Mey) but easily distinguished from all forms of *P. Rhœas* by the shape of its capsule which is like that of *P. dubium*, and from all forms of *P. dubium* by its deeply lobed, star-like disc with ridged crenatures. *Petals* purple with a dark basal eye; *capsule* ¾ in.–1 in. long.

The presence of this species in India has been overlooked owing to its having been mistaken when in flower for *P. Rhœas* and when in fruit for *P. dubium.* Of its specific position there is not however any doubt. the Indian plant is exactly that which forms the type of *P. macrostomum* Boiss. and Huet. Since the publication of the *Flora Orientalis* however very large suites of specimens of *P. macrostomum* have been reported. These show that, like its allies *P. dubium* and *P. Rhœas*, this is an extremely variable plant and a careful study of all the specimens in M. Boissier's own Herbarium, in Herb. Kew and in Herb. Paris has convinced the writer that *P. macrostomum* is not specifically distinct from *P. turbinatum*, the solitary specimen of which has the same capsule and disc and only differs in foliage and in stature from the original specimens of *P. macrostomum.* Since the latter species was proposed all the necessary intermediates have been reported again and again.

8. (—.) PAPAVER DECAISNEI *Hochst. & Steud.* in *Schimp. Pl. Arab. exs.* n. 125 (April 1836); leaves pinnatipartite, segments lanceolate-dentate, cauline rounded at base and amplexicaul, capsule ovate-oblong glabrous, stigma 5–7-rayed. *Boiss. Flor. Orient.* i. 115 (1867). P. turbinatum *Fresen. Mus. Senkenb.* 173 (1834) *non DC.* Papaver sp. nov. *Decaisne, Fl. Sinai.* 45 (1835). P. dubium VAR. Decaisnei *Elkan, Monogr. Papav.* 26 (1839). P. dubium VAR. lævigatum *H. f. & T. Flor. Ind.* 250 (1855) *in part*; *Aitchison. Journ. Linn. Soc.* xviii. 32 (1881) *in part. non Elkan.*

PANJAB: Rawal Pindi, *Aitchison* n. 44! Trans.-Indus dist., *Stewart!* SCINDE: *Stocks!* DISTRIB. Beluchistan, Afghanistan, Persia, Arabia, S. Syria.

A glaucescent glabrous annual or rarely a biennial 6–12 in. high, with very short stems and long peduncles; *flowers* 1 in diam., sepals glabrous, petals obovate rose purple with dark eye; anthers shortly oblong.

The Eastern limit of the geographical area of this species lies just inside the frontier of the Indian Empire along its whole north-west border. The species has been associated by Elkan and by most Indian botanists with *P. dubium* VAR. *laevigatum*, and the resemblance is indeed often very great. It is however easily distinguished by its perfectly glabrous glaucous appearance and by its stem-leaves which clasp at the base. Some specimens collected by Dr. Stapf in Persia show that occasionally the species may be distinctly biennial.

9. (5.) PAPAVER SOMNIFERUM Linn.

It is of interest, in connection with the theory that the people of China first learned the use of Opium and first obtained the Opium Poppy itself from India, to find from a careful examination of specimens of the Poppy cultivated for Opium in China that are preserved in the magnificent botanical collections of London, Paris and Geneva, that this Poppy belongs to a race quite distinct from the Indian plant, more nearly allied to the form of *Papaver somniferum* that produces Persian Opium than to the form that is cultivated in Hindustan. The specimens referred to come from Yunnan, Szechuen, Hunan and Hupeh. Curiously the only Chinese specimens of *Papaver somniferum*, cultivated for Opium, that are indistinguishable from the Indian race, which the writer has seen, are in Herb. Calcutta. They were communicated by Fortune in 1853 and are from the Eastern province of Che-kiang, not from Central or South-Western China where the Opium Poppy is chiefly cultivated.

2. (1*.) ARGEMONE Linn.

1. ARGEMONE MEXICANA *Linn.*

Four of the gatherings issued by Wallich under this name (*Cat. Lith.* n. 8126) are really this species, the fifth (8123 E. from Kamaon) is the yellow-flowered *Meconopsis* described by Hooker and Thomson as *M. robusta*.

3. (2.) MECONOPSIS Viguier.

Key to the Indian species (incorporating the new forms.)

* Stems, leaves, sepals and ovaries prickly; stigmas pyramidal (flowers pale purple, papaveroid, (*i.e.*, petals 4) exceptionally sanguinarioid, (*i e.*, 5–8):—

† Stems not leafy, radical leaves many persisting; scapes radical 1-fld. or pseudo-cymose from agglutination of scapes, pedicels not or very rarely bracteate, torus distinctly enlarged; leaves lanceolate (entire or, rarely, acutely dentate; capsules densely aculeate short oblong or obovate, twice as long as style) .. ... 1. *M. horridula.*

† † Stems leafy, radical leaves few vanishing; flowers in racemose cymes with bracteate pedicels; torus not expanded; leaves oblong:—

‡ Leaves irregularly pinnatifid; capsules densely aculeate, short oblong or obovate, twice as long as style ... ... 2. *M. aculeata.*

‡ ‡ Leaves with sinuate or subentire margins; capsules sparsely aculeate long narrowly obconic, five times as long as style ... ... 3. *M. sinuata.*

* * Stems, leaves, sepals and ovaries without prickles; stigmas capitate entire or (in *M. primulina*) 2-lobed:—

† Stems leafy:—

‡ Stems often branching, cymes many-flowered rare-

ly simple; flowers papaveroid, (*i.e.*, petals 4); (tall tomentose or hirsute plants, radical leaves few, cauline many all scattered; capsules setose):—

§ Capsules ovate 8–11-valved, style short much thickened at base:—

¶ Flowers yellow:—

× × Stems and leaves sparsely crinite at length glabrescent; cauline leaves pinnatifid, lobes rounded acute; sepals sparsely crinite capsule with few adpressed setae 4. *M. robusta.*

×× ×× Stems, leaves and sepals hispidly hairy and densely softly tomentose; cauline leaves coarsely dentate; capsule densely covered with ascending setae and close stellate pubescence ... ... 5. *M. paniculata.*

¶ ¶ Flowers white (stems, leaves and sepals hispidly hairy and densely softly tomentose; cauline leaves finely toothed) ... 6. *M. superba.*

§ § Capsules shortly cylindric 5–7-valved, style long slender throughout:—

¶ Flowers dark fuscous-purple; stems, leaves and sepals sparsely hirsute with long hairs ... ... 7. *M. napaulensis.*

¶ ¶ Flowers pale blue-purple; stems, leaves and sepals softly densely puberulous ... 8. *M. Wallichii.*

‡ ‡ Stems always simple, cymes few-fld. simple; flowers sanguinarioid, (*i.e.*, petals 5–9); (purple):—

§ Radical leaves few vanishing; cauline close-set on a short stem (pseudo-radical) scapes long: small glabrous or sparsely setose plants with narrowly ovoid glabrous capsules *and 2-lobed stigmas* ... ... 9. *M. primulina.*

§ § Radical leaves many persisting, cauline few the lower scattered the upper whorled; pedicels short; tall softly hairy plants with linear-oblong sparsely hispid capsules ... ... 10. *M. grandis.*

† † Stems not leafy scapes numerous radical, (flowers purple, radical leaves many persisting):—

‡ Leaves simple dentate, scapes long, capsules linear-oblong sparsely hispid; large softly hairy plants with sanguinarioid flowers, (*i.e.*, petals 5–8) ... 11. *M. simplicifolia.*

‡ ‡ Leaves 2-3-pinnate; scapes short, capsules shortly obovate glabrous; dwarf perfectly glabrous plants with sub-papaveroid flowers, (*i.e.*, petals 4 or 5)... 12. *M. bella.*

Species 1–3 constitute the group *Aculeatæ* extending throughout the Himalayas and Tibet and occurring in Szechuen and Yunnan; species 4–8, the group *Robustæ* peculiar so far as is known to the central and Eastern Himalaya; species 9 belongs to the group *Primulinæ* of which the remaining known members inhabit Szechuen and Yunnan; species 10 and 11 to the *Grandes* of which the three other known members occur in Kansu, North Tibet, Szechuen and Yunnan; species 11 is the only representative of a very distinct group the *Bellæ*.

The genus includes 2 other groups not represented in India; *viz.*, the *Chelidonifoliæ* with 2 Chinese and 1 Western European species and the *Anomalæ* with 2 Californian species.

Unlike *Papaver*, *Meconopsis* is a characteristically Himalayan genus since 12 species, or nearly one-half of the known forms have been reported from the Himalayan region. Only two occur in the Western Himalaya; one, *M. aculeata*, extending from Garhwal and Kunawar to Kashmir, overlaps the eastern fringe of the area occupied by *Papaver*; the other, *M. robusta*, which is perhaps only a condition, and certainly is at most the representative, of the more widely distributed *M. paniculata*, is confined to Kamaon. It is only when we reach the region from Central Nepal eastward that we come upon the main body of the genus. In Central Nepal we find three species, *M. paniculata*. *M. napaulensis* and *M. simplicifolia*; these we find in Eastern Nepal and Western Sikkim along with five other forms; *M. Wallichii*, which seems only a local manifestation of *M. napaulensis*; *M. sinuata*, a similar local manifestation of *M. aculeata*; *M. grandis*, a local manifestation of *M. simplicifolia*; *M. horridula*, a somewhat variable species widely extended throughout Tibet and Western China of which *M. aculeata* and *M. sinuata* alike appear to be derivates; lastly, the exceedingly distinct *M bella*. Somewhat further east we come upon *M. superba*, a very handsome species that would however appear to be hardly more than a local representative of *M. paniculata*; and *M. primulina*, a near ally, and perhaps only the local representative of a Szechuen species, *M. Henrici*.

The region which includes Western and Central China from Kansu to Yunnan and Hupeh is quite as rich in species as the *explored* Eastern Himalaya. In Kansu there are three species; *M. quintuplinervia* and *M punicea* extending to Northern Tibet, and *M. integrifolia* extending to Szechuen and Yunnan; all three are near allies of the Sikkim *M. simplicifolia*. In Szechuen we find six; one species, confined to the province, is *M. Henrici* nearly allied to the Himalayan *M. primulina*; another is a form of the Tibeto-Himalayan *M. horridula*; a third is apparently a form of the Sikkim *M. sinuata*; a fourth is *M. integrifolia* already discussed; the last two are species which are very distinct from the rest and which have no Himalayan representative, but which are very closely allied to each other; these are *M. chelidonifolia*, confined to Szechuen, and *M. Oliveriana* extending also to Hupeh. In Yunnan, besides *M. integrifolia* and a form of the nearly ubiquitous *M. horridula* there are two species of the *Primulinæ* group, *M. lancifolia* and *M. Delavayi.* * These two species, originally tentatively referred by M. Franchet, in the absence of ripe fruit, to *Cathcartia*, are, as their distinguished author has most obligingly pointed out to the writer, true *Meconopses*, the ripe capsules recently received having valves that are only partially dehiscent. Still another possible species is the plant described by M. Franchet as *M. betonicæfolia*. It may well be a *Meconopsis* but the fruit is not ripe and from its evident close affinity to two Himalayan species that seem undoubtedly referable to *Cathcartia* this may also prove to be better placed in that genus. From Hupeh the already mentioned *M. Oliveriana*[*] is the only species as yet recorded; like *M. chelidonifolia* it also occurs in Szechuen.

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* Meconopsis lancifolia *Franchet MSS.* in *Herb. Paris.* Cathcartia lancifolia *Franchet Bull. Soc. Bot. Fr.* xxxii. 391 (1886). Meconopsis Delavayi *Franchet MSS.* in *Herb. Paris.* Cathcartia Delavayi *Franchet, Bull. Soc. Bot. Fr.* xxxii. 390 (1886).

From what has been said it will be clear that the home of *Meconopsis* is the conjoint Himalo-Tibetan and Tibeto-Chinese regions. But while this is the case there are three species that do not occur within this area and that exhibit a distribution which, even for outliers, is remarkable and peculiar. One species *M. cambrica*, that on which Viguier originally founded the genus, is confined to Western Europe, where it extends from Portugal to Wales, Cumberland and Strath-Clyde, thus overlying the western fringe of the *Papaver* area as *M. aculeata* overlies its eastern fringe. And strangely enough its nearest allies in the genus would seem to be *M. chelidonifolia* and *M. Oliveriana*—precisely the species from which it is furthest separated geographically. The two remaining species *M. crassifolia* and *M. heterophylla* occur in Western America. These are altogether anomalous in having valves which dehisce like those of *Papaver* by short subquadrate pores and in having their stigmatic lobes discrete as in *Chelidonium* or in *Argemone*. More disconcerting still is the fact that in the same area there occur two true *Papavers*, *P. californicum*, and *P. Lemmoni*, the former with a perfectly normal disc, the latter with an umbonate one like *Papaver stylatum*, while all four species are so very nearly related that it is only by an examination of their ripe capsules that they are to be definitely separated. It is not therefore surprising that so careful an observer and so great an authority on Californian species as Prof. E. Greene proposes to treat all four as congeneric. Whether, as he proposes, all should be treated as *Papavers* is a matter that requires, in the writer's opinion, further consideration. It is true that in the genus *Papaver*, as at present understood, are included a number of forms nearly allied to *P. armenaiacum* which have valves that dehisce like *Meconopsis* valves and have stigmas of the normal *Meconopsis* type, so that they differ from *Meconopsis* only in the absence of any style But it does not seem necessary on this account to propose that we should return to the view adopted by Linnæus as regards the European, and by Don as regards the Himalayan species, and speak of all the *Meconopses* as *Papavers*.

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[*] Meconopsis Oliveriana *Franchet & Prain MSS.* in *Herb. Paris.* and in *Herb. Kew.* Stems tall copiously branched, setulose below, glabrous above; leaves numerous, lower and middle shortly petioled sparingly strigose on both surfaces as are the upper sessile somewhat amplexicaul, ovato-oblong pinnatipartite; segments 1-2-jugate petiolulate ovate pinnatifid, lobes rounded obtuse, terminal segment deeply 3-fid: peduncles numerous slender and sepals glabrous; flowers solitary at the end of stem and of the many axillary always leafy branches; capsule long cylindric 4-5-valved, glabrous; placentas nerviform.

CHINA: Szechuen, Tchon-kéou-tin, *Farges* n. 390! Hupeh; *Henry* n. 6863!

Stems erect 2-3 ft. high, as thick as a swan's quill at base, flowers 8–12 terminal; buds globose; style very short and thick; capsule including style 1½ in. long, ¼ in. across; rootstock villous.

This species so closely resembles in all its vegetative characters *M. chelidonifolia* Franchet, that at first it is hard to believe that they can be distinct. The fruit is however totally different; in *M. chelidonifolia* the capsule is short, ovate, ⅝ in. long, and ½ in. across, the style is distinct and slender and the placentas are deeply intruded as they are in the true Poppies. Another difference is in the colour of the petals which seem, judging from dried specimens in Herb. Paris, to be purplish; certainly they are not bright yellow as in *M. chelidonifolia*. Both species much resemble *Cathcartia villosa*.

Another point of interest in the genus is the number of petals. This is given in most systematic treatises as 4. In the three species *M. cambrica*, *M. chelidonifolia*, *M. Oliveriana*, forming the *Chelidonifoliæ*, this is the case, as it is in the *Anomalæ* (*M. heterophylla*, *M. crassifolia*) and in the *Robustæ* (*M. robusta*, *M. paniculata*, *M. superba*, *M. napaulensis*, *M. Wallichii*). Among the *Aculeatæ*, *M. aculeata* and *M. sinuata* would appear to be always 4-petaled, but with *M. horridula* the exceptions are quite as frequent as the rule. In *M. bella* which may have 4 petals we usually find 5; while in two groups—the *Grandes* (*M. simplicifolia*, *M. quintuplinervia*, *M. punicea*, *M grandis*, *M. integrifolia*) and the *Primulinæ* (*M. Henrici*, *M. primulina*, *M. lancifolia*, *M. Delavayi*)—we by no chance ever find 4 petals; in all these species we find, as in *Sanguinaria*, 5-8 or 9 petals imbricately spirally arranged. Yet there is no doubt, in spite of this divergence from the characters usually ascribed to the genus that these species are genuine *Meconopses*.

§ 1. Aculeatæ. *Stems, leaves, sepals and ovaries prickly; stigmas pyramidal; flowers pale purple, usually Papaveroid*, i.e., *with* 4 *petals*; (*occasionally in* M. horridula VAR. typica *and usually in* M. horridula VAR. racemosa *with petals* 5–8).

1. (2.) MECONOPSIS HORRIDULA H. f. & T.

VAR. *typica;* scapes radical one-fld; leaves membranous entire. M. horridula *H. f. & T. Flor. Ind.* 252 (1855); *Walp Ann.* iv. 171 (1857). *Flor. Brit. Ind.* i. 118 (1872).

SIKKIM: Kongra-Lama, Bomtso and Kan-ka-la, 14-17000 ft. abundant, *Hooker!* Kan-kra-la and Donkia, *G. Gammie! Cummins!* CHUMBI: at Te-ling, *Dungboo!* DISTRIB. Central Tibet (*Rockhill!*) and South-Eastern Tibet (*Thorold! King's Collectors!*)

VAR. *racemosa;* some or all of the scapes agglutinated to form a leafless grooved stem with pseudo-racemose inflorescence and bractless pedicels; leaves membranous entire or (rarely) dentate. M. racemosa *Maxim. Bull. Acad. Petersb.* xxiii. 310 et *Mel. Biol.* ix. 713 (1876); *Forbes & Hemsl. Journ. Linn. Soc.* xxiii. [*Ind. Sinens.* i.] 34 (1886); *Maxim. Flor. Tangut.* i. 36. t. 9. f. 1–6 et t. 23. f. 26 (1889).

SIKKIM: Ta-no-gang, Gia-gong and near Cho-la, *King's Collectors!* Lachung, *Dungboo!* Tankra-la (specimens with deeply dentate leaves), *G. Gammie!* CHUMBI: Sham-chen, *Dungboo!* Ta-Chey-Kung, *King's Collectors!* DISTRIB. North Tibet (*Przewalski!*) Central Tibet (near Lhassa, *Dungboo!*) Northern Szechuen (*Potanin!*)

It is impossible to sustain the specific rank claimed for this form. In the northern and central portions of the area inhabited by the species the two forms come from adjacent districts. In Sikkim, the extreme southern limit of its geographical distribution, the two forms grow intermixed; all our Calcutta gatherings, as well as Hooker's original ones, show transitions from the one to the other.

[VAR. *rudis;* stems like those of VAR. *racemosa* but taller, thicker, hardly grooved and leafy at the base with the lower pedicels bracteate; leaves very thick with subsinuate margins and very sparsely prickly as are the sepals and stems; capsules small, hardly exceeding in diam. the much expanded torus. M. racemosa *Franchet, Bull. Soc. Bot. Fr.* xxxiii. 38 (1886); *Plant Delavay.* 41 (1889) *vix Maxim.*

YUNNAN: Li-kiang, *Delavay!*

This plant, united by M. Franchet with Mr. Maximowicz' *M. racemosa,* certainly differs varietally in the points noted]

The suggestion made in the *Flora Indica* and again in the *Flor. Brit. Ind.* that *M. horridula* may after all be no more than an Alpine form of *M aculeata* has not, so far, been supported by the collection of the necessary intermediate forms. On the contrary the facts of distribution among the members of the *Aculeatæ* group point decidedly in the opposite direction. Although *M. aculeata* has capsules remarkably like those of *M. horridula* its torus is not thickened, its leaves are widely dissimilar, its stem is leafy and its pedicels are bracteate.

2. (3.) MECONOPSIS ACULEATA *Royle, Ill.* 67. t. 15 (1839); *Walp. Rep.* i. 110 (1842); *H. f. & T. Flor. Ind.* 253 (1855); *Walp. Ann.* iv. 171 (1857); *Klotzsch, Reis. Pr. Waldem.* 129 (1862); *Hook. Bot. Mag.* t. 5456 (1864); *H. f. & T. Flor. Brit. Ind. i.* 118 (1872). M. Gulielmi-Waldemari *Klotzsch, Reis. Pr. Waldem.* 129 t. 36 (1862); *Walp. Ann.* vii. 86 (1868). M. napaulensis *Jacquem. MSS. in Herb. Paris; Falc. MSS.* in *Herb. Saharanpur; nec* M. napaulensis *DC. Wall. Cat.* n. 8122!

It is not possible to accord even varietal rank to the form figured and described by Klotzsch as *M Gulielmi-Waldemari*

3. (—.) MECONOPSIS SINUATA *Prain;* prickly, stem leafy, leaves oblong-lanceolate, flowers pale blue-purple; capsules long narrowly obconic, sparsely prickly.

VAR. *typica*; leaves obtuse with sinuate margins.

SIKKIM: Patang-la, Pey-kiong-la and Ney-go-la, *King's Collectors!* Jongri, *G. Gammie!* BOOTAN: Dichu Valley, *Cummins!*

[VAR. *Prattii;* leaves subacute serrate or subentire.

SZECHUEN: near Tachienlu, *Pratt.*, n. 525!]

Rootstock stout, fusiform; *stems* 1-3 ft. smooth except for the scattered prickles. *Leaves* 4–7 in., long petioled, upper cauline sessile. *Cymes* few-fld., *flowers* 2-3 in. diam., pedicels bracteate slender fastigiate in fruit, prickly; petals 4. *Capsule* 1¼–1½ in. sparsely prickly, ultimately subglabrous; style ⅙–½ in.; stigma small. *Seeds* scaberulous hilum slightly crested.

This species has much the habit of *M. aculeata* of which it appears to be in the Eastern Himalaya the representative form. It has however different leaves and a totally different capsule with a much smaller stigma. The plant here described as VAR *Prattii* has leaves quite like those of *M. horridula* VAR *racemosa* though of somewhat thinner texture. But besides having bracteate pedicels it differs in having an unexpanded torus and a much less aculeate ovary. The capsules of VAR. *Prattii* are unfortunately not yet ripe but they agree exactly with those of typical *M sinuata* at a similar stage and are totally unlike those of *M. horridula* or *M. aculeata* at any stage

§ 2. Robustæ. *Tall often branching; stems, leaves and sepals hirsute or pubescent; ovaries setose; stigmas capitate; leaves pinnatifid to -partite, radical many withering, cauline numerous all scattered; flowers Papaveroid*, i.e., *with 4 petals.*

4. (4) MECONOPSIS ROBUSTA *H f. & T. Flor. Ind.* 253 (1855); tall, glaucescent, glabrous or sparsely crinite with soft flexuous spreading hairs, leaves pinnatifidly lobed, lobes rounded acute, tips of peduncles and sepals sparsely patently crinite; cymes simple, flowers sulphur yellow, margins of petals crenulate; capsule obovate-oblong 8–11-valved, sparingly covered with adpressed sub-deciduous setæ. *Walp. Ann.* iv. 171 (1857). M. nipalensis *Hook. f. Bot. Mag.* t 5585 (1866) *nec DC. et vix H. f. & T. Flor. Ind. & Flor. Brit. Ind.* M. robusta *H. f. & T. Flor. Brit. Ind.* i. 118 (1872) *in part; excluding the Nepal plant and the citation* Wall. Cat. 8121. Argemone mexicana *Wall. Cat.* 8126 E (1830) *nec Linn. Wall. Cat.* n. 8124!

WESTERN HIMALAYA: Kamaon, 8–10,000 ft. *Blinkworth* in *Wall. Cat.* n 8124! 8126 E! and in a third specimen without number in the Wallichian type herbm.! Nanik, *Strachey and Winterbottom!* Chenab Valley, *Stewart! Ellis* n. 1362! 1471! near Mussoorie, *King!* Pindi, *Collett!* Palang Gadh, Byans; above Ramri; and Galmar, 10–12,000 ft., *Duthie!*

Stems simple or branched 4–6 ft high almost 2 in. thick at base; cymes lax-fld. 1-2 ft. long, flowers 2-3 in across; sepals ½ in.; styles thickened at base ½ in long; capsule, including style, 1¾ in.

This species, apparently strictly confined to Kamaon though not at all uncommon there, is perhaps only a geographical form, certainly is the western representative of the next species, from which it only differs in the want of fine pubescence intermingled with its long hairs, in the somewhat different lobulation of its leaves and in the margins of its petals being crenulate. In the *Flora Indica* Hooker and Thomson have cited only the Kamaon locality and only Wallich's n. 8124, and 8126, both of which came from that province, for their species. The description given, however, of the capsule applies rather to Wallich's n 8121 from Nepal which is cited as equivalent to n. 8124, in the *Flora of British India*, where the locality Nepal is also given for the species. But the plant thus included (*Wall. Cat.* n. 8121) is *not* the same as the Kamaon one; it is the true *M. napaulensis* of *DC.* [*Prodr.* i. 121]—the crimson-flowered portion of *Stylophorum paniculatum* of *G. Don* [*Gen. Syst* i. 135]—and is not distinguishable from the *M. Wallichii* VAR *rubrofusca* of *Bot. Mag.* t. 6760. This plant agrees with *M. robusta* in having hirsute, but not tomentose, stems, leaves and sepals, but differs in having dark-red instead of yellow flowers and in having a narrower capsule with reddish spreading instead of adpressed or ascending yellow setæ with about half the number of valves and with a longer style slender throughout.

5. (5.) MECONOPSIS PANICULATA *Prain;* tall stout hirsute with soft flexuous spreading hairs and densely clothed with a soft substellate golden-yellow or grey pubescence; leaves linear-oblong or oblanceolate sinuately lobed, lobes widely-triangular-toothed, cymes paniculate or simple; flowers yellow, margins of petals entire; capsule obovate-oblong 8–11-valved densely covered with ascending subpersistent setæ and with close stellate pubescence.

VAR. *typica;* cymes paniculate, pedicels subfastigiate branched longer than the leaves even in flower sepals sometimes only puberulous. Papaver paniculatum *D. Don, Prodr. Flor. Nep.* 197 (1825). Stylophorum paniculatum *G. Don, Gen. Syst.* i. 135 (1831) *in part only and as to the yellow-fld. plant cited.* Meconopsis napaulensis *Walp. Rep.* i. 110 (1842) *not of DC.* Meconopsis Wallichii *H. f. & T. Flor. Ind.* 254 (1855) *Walp. Ann.* iv. 171 (1857); *H. f. & T. Flor. Brit. Ind.* i. 119 (1872) *in part only and as to the citation* Wall. Cat. n. 8123/b; *not of Hook.* Polychætia paniculata *Wall. MSS.* in *Herb. Wall.* n. 8123/b.

NEPAL: Gossain Than; *Wallich.* n. 8123/b! SIKKIM: Jongri, *King's Collectors!* Ling-tu, *King's Collectors!* Phalloot, 10,000 ft., *King's Collectors!* Lachung and Tankra, 11,000 ft., *G. Gammie!* BOOTAN: Tak-poo, *Dungboo!*

VAR. *elata;* cymes simple, pedicels usually solitary, sometimes 2 together, spreading; not or hardly longer than the leaves in flower, elongating and fasciculate in fruit. Meconopsis nipalensis *H. f. & T. Flor. Ind.* 253 (1855); *Hook. f. Ill. Him. Pl.* t. 9 (1855); *Walp. Ann.* iv. 171 (1857); *H. f. & T. Flor. Brit. Ind.* i. 118 (1872): M. nepalensis *Lemaire, Ill. Hortic.* iii. 95 (1856)—*not* M. napaulensis *DC.* M. Wollastonii *Regel, Gartenfl.* xxv. 291 (1876) *name only. Wall. Cat.* n. 8123/a.

CENTRAL HIMALAYA: *Wallich,* n. 8123/a! SIKKIM: Lachen, *Hooker!* Natong, *Dungboo!* Patang-la, *King!* Jongri, *King's Collectors!* Singalelah, *G. Gammie!* Lachung, *G. Gammie!*

Stems sparingly branched or simple 3–5 feet high, 2–3 in. thick at base; radical and lower cauline leaves petioled 6–18 in. long; cymes lax-fld. 1–2 feet long conspicuous; sepals in VAR. *typica* ½–¾ in, in VAR. *elata* 1 in. long; flowers in VAR. *typica* 2 in., in VAR *elata* 3 in. diam.; style thickened at base ½ in. long; capsule, including style, 1½–2 in.

Except for the more branching habit, the smaller amount of gross pubescence and the smaller flowers in VAR. *typica* there is nothing to separate the two varieties which pass into each other by many intermediates and are only sustained here in order the more easily to explain the somewhat complex synonymy which has arisen from the inadequacy of the material in European Herbaria. In some cases VAR. *typica* has only a close stellate pubescence and then remarkably resembles *M. Wallichii*, but even if the colour of the petals has not been noted the ovaries with 10–11-placentas and the 10–11-lobed stigma, or at a later stage the larger ovate 10–11-valved capsule with shorter style much thickened below and the altogether different pubescence of the capsule amply distinguish this from *M. Wallichii*.

That *Wall. Cat.* n. 8123/b is D. Don's *Papaver paniculatum* is made certain by the fact that Don has himself written this name on the type sheet of Wall. Cat. n. 8123/b, which moreover retains the original field ticket on which Wallich has written the MSS name *Polychætia paniculata*. D. Don has at the same time identified n. 8123/b with *Meconopsis napaulensis* DC.; this identification is quite erroneous; *Meconopsis napaulensis* forms the red-flowered portion of G. Don's *Stylophorum paniculatum* whereas D. Don's *Papaver paniculatum* forms the yellow-flowered portion of G. Don's *Stylophorum paniculatum*. Hooker and Thomson on the other hand have assigned the name *M. nipalensis* to *Wall. Cat.* n. 8123/a, and have referred *Wall. Cat.* n. 8123/b to *M Wallichii* in this following Sir W. Hooker who does not however include Wallich's yellow-flowered Nepal plant in his description of the blue-flowered Sikkim one though he cites the sheet itself. Besides being both, as it now transpires, truly conspecific, neither of the portions of Wallich's n. 8123 agrees at all well with the original description of *M. napaulensis*; that description applies alone among the Himalayan species, to *Wall. Cat.* n. 8121 and a comparison of that number with the original *M. napaulensis* in Mr. C. de Candolle's "Prodromus Herbarium" shows them to be identical.

The precise locality of *Wall. Cat.* n. 8123/a is doubtful. The original field ticket is missing; in the *Lith. Cat.* list it stands as "Kamaon?" This citation is almost certainly wrong; for the species does not occur amongst the plants sent by Blinkworth from Kamaon, and no collector has found it in Kamaon since Blinkworth's time. In all probability, *Wall. Cat.* n. 8123/a, like n. 8123/b, came from Nepal.

6. (—.) MECONOPSIS SUPERBA *King;* tall stout hirsute with soft flexuous spreading hairs and densely clothed with soft grey pubescence; leaves obovate oblong serrate; cymes simple; flowers white margins of petals entire; ovary globose 7–11-valved densely clothed with adpressed setæ and with close stellate pubescence.

BOOTAN: Ho-Ko-Chu, *Dungboo!*

Stems simple, apparently 6 ft. high, 1½ in. thick within 2 feet of top; cauline leaves sessile amplexicaul 10–20 in. long; cymes rather dense-fld, pedicels 2–3 in each axil; sepals 1¾ in. long; flowers nearly 4 in. diam.

This very fine plant is perhaps only a form of *M. paniculata* VAR. *elata;* the chief differences are the larger size of all its parts, the white, not yellow, petals and the serrate but not lobed cauline leaves. The ovary is exactly like that of *M paniculata*; ripe fruit is as yet unknown.

7. (—.) MECONOPSIS NAPAULENSIS *DC. Prodr.* i. 121 (1824); tall glaucescent sparsely hirsute with soft flexuous spreading hairs rarely also thinly substellately pubescent, leaves lobed pinnatipartite or lyrate-pinnatisect lobes rounded-oblong widely crenate-dentate; cymes simple or paniculate, tips of peduncles and sepals patently hirsute,

flowers dark fuscous-purple, capsules subcylindric or narrowly ovate 4–6-valved, densely covered with harsh setæ at first yellow and adpressed at length rufous and spreading or subreflexed. Meconopsis robusta *H. f. & T. Flor. Brit. Ind.* i. 118 (1872) *in part and as to the Nepal plant cited* (Wall. Cat n. 8121) *not of H. f. & T. in Flor. Ind.* M. Wallichii VAR. rubrofusca *Hook. f. Bot. Mag.* t. 6760 (1884). Stylophorum nepalense *Spreng. Syst.* iv. cur. post. 203 (1827). S. paniculatum *G. Don, Gen. Syst.* i. 135 (1831) *in part only and as to the crimson-fld. plant cited.*

NEPAL: Gossain Than, *Wallich* n. 8121! Thari, in Eastern Nepal, *King's Collectors!* SIKKIM: Tehni-Zon *King's Collectors!* Tiamphung and elsewhere in Jongri, frequent, *King's Collectors!*

Stems simple 2–5 feet high, ½–1 in. thick at base; flowers nodding, 3 in. in diam.; lower cauline leaves long-petioled; sepals rather densely crinite but not or sparsely stellate-pubescent; petals broadly obovate-oblong; capsules ½–1 in. with a slender style ½–¾ in. long.

The *bibliographical* relationship of this species to *M. robusta* and *M. paniculata* has been already explained. From both it is readily distinguished by its dark purple not yellow flowers, by its smaller capsule with fewer valves and very different setæ, and by its much longer slender style. Its association with *M. robusta* has been due to both having rounded lobes of leaves and to the two having very similar sepals. Its identification with *M. paniculata* has been the result of a misapprehension on the part of Mr. D. Don who, of the two *Meconopsis* collected by Wallich in Nepal, has, contrary to M. de Candolle's explicit statement, selected the many-valved one as the equivalent of the *Prodromus* species. Mr. G. Don has attempted to overcome the difficulty thus created by treating these two Nepal plants, the red and the yellow-fld., as conspecific. This is however impossible for the *botanical* relationship of *M. napaulensis* is, as Sir Joseph Hooker has clearly shown, in the most recent notice of this species (*Bot. Mag.* t. 6760), with *M. Wallichii.* It has many of the characters of that plant but besides having dark-red-, in place of pale-blue-purple flowers it is easily distinguished by its leaves and sepals being patently crinite with long hairs and by having very little, usually indeed none, of the close stellate pubescence that characterises the leaves and sepals of *M. Wallichii* where on the other hand there are none of the long hairs of *M. napaulensis.* This species has only recently been successfully introduced into European Gardens, plants having been reared by Mr. G. Wilson in his garden at Weybridge from seeds sent by Dr. King. It may ultimately be satisfactorily proved that Sir Joseph Hooker's suspicion, which the writer shares, that this and *M. Wallichii* are only forms of one species, is correct. In that case the name *M. Wallichii* which has become familiar in European horticulture will have to give way to the older name *M. napaulensis,* which is at present, but quite erroneously, associated in European gardens with Wallich's yellow-fld. species. In the meantime however it is more satisfactory and less misleading to treat *M. napaulensis* and *M. Wallichii* as specifically distinct.

8. (6.) MECONOPSIS WALLICHII *Hook. Bot. Mag.* t. 4668 (1852); *Jard. Fleur.* iii. t. 315 (1853); *Belg. Hortic.* iv. t. 18 (1854); *Flore des*

Serres, viii. t. 735 (1855) ; *H. f. & T. Flor. Ind.* 254 (1855) ; *Walp. Ann.* iv. 171 (1857) ; *H. f. & T. Flor. Brit. Ind.* i. 119 (1872) *excluding in all cases the citation* Wall. Cat. 8123/b *and the Nepal locality*.

This is the pale-blue-fld. paniculate "Poppy" familiar to all travellers in Sikkim. Dr. King's Collectors have brought it also from Chumbi (Sham-Chen) and Dr. Cummins has sent specimens to Calcutta from Bootan (Dichu Valley) but though it thus extends further to the east than the *F. B. I.* indicates it has not as yet been collected in Nepal. The plant has long been cultivated in Europe, seeds having first been sent home by Sir Joseph Hooker in 1848 and plants having been reared at Kew by Sir William Hooker who figured and described the species. Sir William identified with this the paniculate form of Dr. Wallich's yellow-flowered Nepalese species which is often remarkably like this pale-purple-fld. plant, until ripe fruit is obtained. There is however no possibility of confounding the capsules of the two—those of *M. Wallichii* are smaller and narrower with 5–6 valves, with spreading rufous setae and a longer slender style; the yellow-fld. plant has longer widely-ovate capsules with 8–11 valves, setae that are less patent and that remain yellow throughout and a shorter style much thickened at the base. One result of the identification of these two plants has been that the *Meconopsis* named in Dr. Wallich's memory is one that he never collected or distributed.

§ 3. Primulinæ. *Stems very short simple, leaves and sepals glabrescent; ovaries glabrous (in a Chinese species strigose at apex); stigmas cleft or 2-lobed; leaves simple entire, radical few vanishing, cauline numerous close-set and pseudo-radical; flowers Sanguinarioid i. e. with* 6–9 *petals.*

9. (—.) MECONOPSIS PRIMULINA *Prain*; almost glabrous, stem short leafy at the base only, leaves linear-oblong entire acute, radical few spathulate, all narrowed into short petioles and very sparsely strigose on both surfaces flowers on a terminal and one to two axillary scapes pendulous dark violet-purple; sepals 2 glabrous, petals 6–8 imbricate narrowly ovate with a distinct claw; stamens about 50, filaments filiform as long as the ovary, anthers orbicular-ovate golden-yellow; ovary glabrous 4-carpelled narrowly ovate tapering into a slender style ⅓ as long; stigmas 2-partite lobes oblong plano-convex, outer convex surface 2-stigmatic.

BOOTAN. Do-lep, *King's Collectors !* CHUMBI : Sham-Chen, *Dungboo !*

Rootstock fusiform 1–4 in. long, neck clothed with old sheaths; leaves 1½–2½ in. by ¼ in.; central scape 7 in., lateral 3–4 in.; sepals ½ in., petals ¾ in. long, ¼–½ in. wide, inner narrower; filaments of the outer series often united into petaloid phyllomes with antheriferous fringe; *ovary* ⅜ *in long*, $\frac{1}{12}$ *in. wide*, placentas far intruded and passing up the substance of the style as 2 pairs of approximated traces, each trace bearing at the base of the style a projecting papilla laterally inclined so that the 4 papillæ are in 2 pairs alternate with placental traces and style lobes and opposite the stigmatic cleft, outer stigmatic loops alternate with placentas. The capsules though apparently full-grown are unripe.

The nearest ally of this species is *Meconopsis Henrici*, Franchet [*Journ. de*

Botanique v. 19 (1891,] from Szechuen which has more numerous leaves, also close-set on a short stem and not truly radical, more numerous stouter scapes and rather larger flowers that though nodding in bud are not nodding when full-blown. *M. Henrici* has however a very different ovary which is depressed globose, strigose in its upper half and considerably shorter than the style. In M. Franchet's species the same peculiar grouping of the filaments of the outer-series in flat phalanges is also sometimes met with but there are no epaulettes of papillæ on the capsule. Another species in which the leaves and stems are exactly like those of *M. primulina* is *Meconopsis lancifolia* Franchet, from Yunnan. This has a glabrous ovary and short style and except in wanting the epaulettes and having a less deeply lobed stigma hardly differs from *M. primulina.* The flowers too are almost identical but instead of having a few flowers on long scapes, it has numerous flowers arranged in a racemose cyme with the pedicels bractless as in *M. horridula* VAR. *racemosa*, while the sepals are slightly and the stem and pedicels are rather densely strigose.

Another Yunnan species of this group is *Meconopsis Delavayi* Franchet, of which the flowers are exactly as in *M. lancifolia, M. Henrici* and *M. primulina* but which has solitary scapes and crowded very long-petioled pseudo-radical leaves with small spathulate-hastate blades.

§ 4. Grandes. *Stemless or with simple stems, leaves and sepals softly hairy; ovaries hispid; stigmas large capitate ridged; leaves simple entire (in the Chinese) or dentate (in the Indian species), radical very numerous persisting, cauline, if present, few scattered below, whorled above; flowers Sanguinarioid i.e. with 5–8 petals.*

10. (—.) MECONOPSIS GRANDIS *Prain;* softly hairy, radical leaves tufted numerous ovate-lanceolate coarsely serrate, tapering into a long petiole; cauline leaves shortly petioled or sessile; flowers large very deep blue; ovary subcylindric sparingly covered with harsh spreading ultimately subdeciduous hairs; placentas 5, slightly intruded; style ⅓ the length of ovary; capsule linear-oblong.

SIKKIM: Jongri, in Western Sikkim, very common at 10–12,000 feet, *King's Collectors! Watt* n. 5435! *G. A. Gammie!*

Rootstock stout, clothed with sheaths, neck villous; radical leaves 3½–7 in. by 1–2 in. with petioles 6–9 in. long; stem 1½–3 ft. high leafy, leaves passing into bracts, the lower 1–3 scattered, the upper 3–5 collected in a whorl, lowest shortly petioled vacant, the next 1–2 with axillary flower-buds: bracts of the whorl subequal 5–6 in. by 3 in. with 1–2 axillary flowers; main axis terminating in a 1-fld. scape extending 6–18 in. beyond whorl; sepals 2 hairy, petals 5–7 imbricate, buds 1½ in., flowers 5 in. diam.; stamens ∞; capsules 2½ in. long, seeds rugose.

This, one of the finest species of *Meconopsis* in the Himalayas, is evidently, in spite of its great difference of habit, very closely allied to *M. simplicifolia* with which it agrees in having tufted coarsely dentate radical leaves and of which it has exactly the capsules and the seeds. It is also nearly related to *Meconopsis integrifolia* Franchet [*Bull. Soc. Bot. Fr.* xxxiii. 389 (1886) et *Plant. Delavay* 41 (1889); *Maxim. Flor. Tangut.* i. 35 t. 9. f. 7–12 et t. 22. f. 23–25 (1889): Cathcartia integrifolia *Maxim Bull. Ac. Imp. Petersb.* xxiii. 310 et *Mel. Biol.* ix. 713 (1876); *Forbes & Hemsl. Journ. Linn. Soc.* xxiii. (*Ind Sinens.* i.) 34 (1886)] which agrees with *M. grandis* in having tufted radical leaves and in having a stem that, though shorter, has also 1–2 scattered leaves below and a whorl of 5–8 bracts with 2–3 axillary as well as a terminal flower above, but which differs in having all the leaves entire, in having yellow in place of dark purple flowers, and in having a very short style with a rather larger stigma. Of the two, *M. integrifolia* is perhaps the more beautiful species; both must prove, when ultimately introduced, great acquisitions to European horticulture. *M. grandis* seems to be confined to the district of Jongri but is very plentiful there.

11. (—.) MECONOPSIS SIMPLICIFOLIA *Walp. Rep.* i. 110 (1842); *H. f. & T. Flor. Ind.* 252 (1855); *Hook. f., Ill. Him. Pl.* t. 8 (1855); *Ill. Hortic.* iii. 114 (1856); *Walp. Ann.* iv. 170 (1857); *Flore des Serres* xiii. t. 1324 (1858); *Flor. Brit. Ind.* i. 118 (1872). Papaver simplicifolium *D. Don, Prodr. Fl. Nepal.* 196 (1825) Stylophorum simplicifolium *Spreng. Syst.* iv. cur. post. 203 (1827); *G. Don, Gen. Syst.* i. 135 (1831). *Wall. Cat.* n. 8125.

The species most nearly related to *M simplicifolia* is *M. quintuplinervia* Regel [*Gartenfl.* (1876) 291, t. 880, f. *b. c. & d.*; *Maxim. Flor. Tangut.* 34. t 23. f. 27 (1889)] from Northern Tibet and Kansu. *M. quintuplinervia* differs from the Himalayan species in having entire leaves, filaments sub-2-seriate those of the outer rather shorter series being moreover slightly dilated upwards. A second closely allied species is *M punicea* Maxim. [*Flor. Tangut.* 34. t. 23 f. 12–21 (1889)] which also differs from *M. simplicifolia* in having entire leaves but is further easily distinguished from both *M. simplicifolia* and *M. quintuplinervia* by having much longer and narrower petals and by having a short globose ovary with a much larger almost sessile stigma.

§ 5. Bellæ. *Stemless; scapes, leaves, sepals and ovaries glabrous, stigmas small capitate; leaves 2–3-pinnatifid all radical numerous persisting, flowers sub-Papaveroid, i.e. petals* 4 or 5.

12. (—.) MECONOPSIS BELLA *Prain, Journ. As. Soc. Beng.* lxiii., pt. 2, 82 [*Noviciæ Indicæ* vii. 71] (1894).

This species is, as already mentioned in this work, very distinct from any hitherto reported *Meconopsis* and represents a group not very closely related to any of the preceding. This also, when ultimately introduced, must prove a great acquisition to European horticulture.

4. (—.) RŒMERIA MEDIK.

Annual herbs with yellow juice; leaves petioled pinnatipartite with multifid lobes; flowers in cymes, on slender leaf-opposed pedicels; sepals 2, petals 4 violet-purple, with a dark basal eye; stamens numerous; ovary linear, stigmas 2–4-lobed sessile; rays opposite the many-ovuled placentas. *Capsules* elongated, 3–4-valved, 1-locular, dehiscing throughout their length; seeds scrobiculate, without crests. Species 2; Mediterranean and Oriental.

Key to the Indian Species.

* Capsule uniform, setose; filaments filiform ... 1. *R. hybrida.*
* * Capsule narrowed upwards, glabrous; filaments dilated 2. *R. refracta.*

The area occupied by *Rœmeria* is the conjoined Mediterranean and Oriental regions so that only the merest fringe of their area comes within the limits of the Indian Empire. Like *Papaver* therefore *Rœmeria* is not really an Indian genus. The nearest natural allies of its species are the prickly-capsuled members of *Papaver* § *Rhœades* from which they only differ in having valves that dehisce throughout instead of by pores. By this character *Rœmeria* approaches *Cathcartia* and that so closely that, as originally defined, *Cathcartia* differs only from *Rœmeria* in having crested seeds and differently coloured flowers. A new *Cathcartia* from Sikkim, however, agrees with *Rœmeria* in both characters; but for the presence of a style, not admitted in the original definition, in the species of *Cathcartia*, that genus must have been merged in *Rœmeria* from which it therefore only differs by the character that separates *Meconopsis* from *Papaver*. The place usually assigned to *Rœmeria* in taxonomic works is close to *Chelidonium* and *Glaucium*; the arrangement is neither natural nor convenient.

1. RŒMERIA HYBRIDA *DC. Syst. Veg.* ii. 92 (1821); leaves pinnatifid to -sect; filaments subulate; capsule uniformly patently setose.

VAR. eriocarpa *DC. Syst.* ii. 93 (1821); leaf segments oval oblong, flowers small. R. pinnatifida *Boivin* in *Belang. Voy. Ic.* t. 2 (1838). R. orientalis *Boiss. Ann. Sc. Nat.* ser. ii xvi. 374 (1841); *Flor. Orient.* i. 118 (1867). R. Schimperi *Presl., Bot. Bemerk.* 8 (1843). R. hybrida VAR. δ. *H. f. & T. Flor. Ind* 257 (1855); *Walp Ann.* iv. 174 (1857).

NORTH-WEST FRONTIER: British Beluchistan; *Hamilton! Duke! Duthie! Lace!* DISTRIB. (of species) Westward to Spain: (of variety) Beluchistan, Afghanistan and Persia to Egypt.

Flowers 1 in. in diam. Capsules 1–2 in long more or less copiously setose alike on placental ribs and valves. The variety hardly differs from the typical *R. hybrida*, which in the true Mediterranean region is itself very variable, except in the shape of the leaf segments and the smaller size of flowers and fruit.

All the specimens from British territory belong to this variety, which Boissier and others treat as a species. If so dealt with it should however be noted that the oldest name is not Boissier's one of *R. orientalis*, but Belanger's one of *R. pinnatifida*. The oldest name for the species as a whole is *R violacea* Medik [*Ust. Ann.* iii. 15 (1792)] but that employed by DeCandolle being in more general use I have continued its employment.

2. RŒMERIA REFRACTA *DC. Syst. Veg.* ii. 93 (1821); leaves 2-pinnatipartite segments linear; flowers large filaments dilated; capsule narrowed at the tip, glabrous. *Delessert, Icon. Select.* iii. t. 8 (1823); *DC. Prodr.* i. 122 (1824). R. rhœadiflora *Boiss. Diagn.* ser. i. vi. 7 (1845); *Flor. Orient.* i. 119 (1867). R. hybrida VARS. β. γ. *H. f. & T. Flor. Ind.* 257 (1855); *Walp. Ann.* iv. 174 (1857).

NORTH WEST HIMALAYA: Badakshan, *Giles!* DISTRIB. Afghanistan, Beluchistan, Turkestan, Persia, Armenia.

Flowers 2 in. in diam. Capsules 1–2 in. long, without setae on the valves, sometimes with a few along the placental ribs.

When M. Boissier in 1845 first defined *R. rhœadiflora* he considered it a species apart from *R. refracta*; the only character, however, by which he could diagnose his species was that its pedicels did not turn down. There is however no character to separate the two and M. Boissier admits this when in the *Flora Orientalis* he includes under *R. rhœadiflora* the solitary gathering (Derbent, *Steven!*) on which the species *R. refracta* was founded! By an oversight, however, he omits to cite the name that DeCandolle had already given to the specimens of this gathering, or to merge his own later name in it. The writer, who has examined both Steven's, and therefore DeCandolle's, as well as Boissier's original specimens is satisfied that Boissier is right in considering the two conspecific. And a note by Stocks, on the specimen in Herb. Calcutta of the gathering from Beluchistan identified by Boissier with *R. rhœadiflora*, shows that that botanist had already recognised the identity of Boissier's species with *R. refracta* DC.

5. (—.) GLAUCIUM Tournef.

Biennial or perennial glaucous herbs with yellow juice. Radical leaves rosulate petioled, cauline more or less amplexicaul incised or lobed. Peduncles axillary or terminal 1-fld. Sepals 2; petals 4, orange-yellow convolute, stamens numerous; ovary linear; stigma 2-lamellate sessile, lamellae erect, alternate with the placentas and projecting at each end so as to form conjointly two horizontal arms stigmatic above, opposite the placentas. Capsule a slender cylindric pseudo-siliqua, valves dehiscing throughout their length and leaving a pseudo-replum resulting from union of margins of intruded placentae, in which the seeds are semi-immersed. Seeds scorbiculate without crests. Species about 15; throughout the Mediterranean, Oriental and Central Asian regions.

Key to the Indian Species.

* Pods slender, not much thicker than peduncles, slightly torulose, contorted or irregularly curved, rarely straight 1. *G. elegans*.

* * Pods stout, nearly twice as thick as peduncles, not torulose, straight or only slightly regularly bent ... 2. *G. squamigerum*.

Like *Rœmeria* and *Papaver*, *Glaucium* is not a truly Indian genus. The difficulty of distinguishing satisfactorily the different forms has led in various taxonomic works to a great diversity of treatment. In the *Flora Orientalis* M. Boissier has distinguished thirteen *Oriental* species; in *Acta Hort. Petrop.* (1887) Dr. Kuntze has proposed the extreme measure of reducing all the forms to one very variable species *Glaucium corniculatum*. Doubtless the truth lies somewhere between these two extremes. M. Boissier was an author of the greatest care and of the highest judgment and the various forms that he describes are at all events recognisable. And though it is possible to some extent to justify the view of Dr. Kuntze when the genus is looked at from the monographer's stand point, it is not necessary or advisable to adopt it when dealing with the flora of a given area. Besides, an examination of Kuntze's work does not leave the impression that he appreciates the value, even for varietal differentiation, of the characters exhibited by the varieties and subvarieties which he recognises. Kuntze's later proposal, that the name *Glaucium*, owing to its similarity to the name *Glaux* (*Primulaceæ*), must give place to another, is mere pedantic trifling with a subject that has some claim to serious treatment.

1. GLAUCIUM ELEGANS *Fisch. & Mey. Ind. Sem. Hort. Petrop.* i. 29 (1835); glabrescent, radical leaves obovate-oblong pinnatifid, lobes shortly ovate crenately toothed; cauline cordate-amplexicaul broadly ovate obtusely toothed; sepals papillose, petals small orange with red eye; capsule slender, torulose, often contorted, sparingly setose with spreading prickles, seeds oblong-cylindric curved. *H. f. & T., Flor. Ind.* 255 (1855); *Boiss. Flor. Orient.* i. 120 (1867). G. pumilum *Boiss. Ann. Sc. Nat.* ser. ii. xvi. 374 (1841). G. squamigerum *Bunge, Rel. Bot. Lehm.* 192 (1847); *Boiss. & Buhse, Aufzähl.* (1860); *nec Kar. & Kir.*

NORTH-WEST FRONTIER: Kohat, at Mirkhworli, *Drummond!* DISTRIB. Afghanistan, Turkestan, and N. Persia to Armenia.

Stems 1 ft. or higher, slender much branched, radical leaves 1½–2 in., sepals ⅓ in. long, buds ⅛ in diam; flowers 1 in. diam.; capsule usually twisted 2–3 in. long, narrowed (subtorulose) between the seeds.

2. GLAUCIUM SQUAMIGERUM *Kar. & Kir. Bull. Soc. Mosc.* xv. 141 (1842); glabrescent, radical leaves lyrate-pinnatifid, lobes ovate wide toothed, terminal subquadrate; cauline cordate-amplexicaul, broadly oblong acutely lobed; sepals glabrous, petals orange-yellow; capsule straight or curved, sparsely setose; seeds reniform deeply pitted. *Regel & Herd. Bull. Soc. Mosc.* xxxvii. 406 (1864). G. persicum *Bunge, Rel. Bot. Lehm* 192 (1847) *nec DC.* G. corniculatum *H. f. & T. Flor. Ind.* 256 (1855) *nec Linn.* G. luteum VAR. fimbrillifera *Trautv. Bull. Soc. Mosc.* xxxiii. 92 (1860). G. fimbrilligerum *Boiss. Flor. Orient.* i. 120 (1867).

NORTH-WEST HIMALAYA: Badakshan, *Giles!* N.-W. FRONTIER: Kach, *Lace!* Nal, *Duke!* DISTRIB. Beluchistan, Afghanistan, Turkestan, Soongaria.

Stems 1 ft. or higher, branching; radical leaves, 2–6 in., sepals ¾ in. long, buds ¼ in. or less in diam.; flowers 1½–2 in. diam., petals bright yellow (*Aitchison*); capsule usually slightly curved, 6–8 in. long; adpressed aculeate, flattened (scale-like) setae ultimately suberect.

Glaucium elegans is perhaps one of the most distinct of the forms in this troublesome genus where all the forms are somewhat variable and seem to pass one into the other. *G squamigerum*, on the other hand, is, so far as Afghan and Beluch specimens are concerned, most like *G. arabicum* Fresen. from Sinai, which in turn much resembles and is perhaps only a geographical form of *G. corniculatum*. As represented in Herb. Kew, Herb. Boissier and Herb. DC., *G. fimbrilligerum* Boiss. and *G. squamigerum* Kar. & Kir. would appear to be specifically separable but a fine suite of specimens from Turkestan in Herb. Paris shows that they pass into each other and that it is not possible to separate them even varietally.

6. (3.) CATHCARTIA Hook. f.

Key to the Indian species (incorporating the new forms).

* Stigma large, style very short; flowers large, stamens numerous (32); a softly hairy plant with (cordate lobed leaves and) rounded yellow petals ... 1. *C. villosa.*

* * Stigma small, style distinct, flowers small, stamens definite (16); glabrescent herbs with narrow pale-purple petals:—

- † Leaves hastate-entire to lyrate-pinnatifid; petals ovate-lanceolate, obtuse, apex subfimbriate ... 2. *C. lyrata.*
- † † Leaves ovate-lanceolate; petals lanceolate, acute, apex entire ... ... 3. *C polygonoides.*

A purely E. Himalayan genus only separable from *Meconopsis* by the character of capsule dehiscing by valves from apex to base. As originally described the genus was supposed to have no style. There is however even in the original species a distinct, though short, style.

1. Cathcartia villosa *Hook. f. Bot. Mag.* t. 4596 (1851); *Flore des Serres* vii. t. 686 (1851); *Lemaire, Jard. Fleur.* ii. t. 167 · (1852); *H. f. & T., Flor. Ind.* 254 (1855); *H. f., Ill. Him. Pl.* frontisp. (1855); *Walp. Ann.* iv. 175 (1857); *H. f. & T., Flor. Brit. Ind.* i. 119 (1872.)

This has been obtained in Eastern Nepal as well as in Sikkim by Dr. King's Calcutta collectors.

2. Cathcartia lyrata *Cummins & Prain*; glabrescent, rootstock slender clothed with sheaths; stem slender glabrous; radical leaves few early withering, cauline 3–4 from hastate-entire to lyrate-pinnatifid sparingly hirsute on both surfaces; flowers small, blue, solitary or in few-fld. cymes; style distinct; stigma small 2–3-lobed; seeds smooth without crests.

Sikkim Himalaya; 13–14000 feet, not common; Ta-ne-da *King!* Chiani, Phallut, and Jongri, *King's Collectors!* Tankra, *G. Gammie!* near Gnatong, *H. A. Cummins!*

Stem 3–10 in. simple or sparingly branched; *leaves* ½–1½ in. by ¼–¾ in., radical disappearing, cauline petioles ½–1½ in. *Flowers* 1-3 (usually solitary), *sepals* glabrous, buds ¼ in. diam. nodding; full blown flowers 1 in. diam.; pedicels very slender, petals narrowly to widely lanceolate rounded or obtuse rarely acute always fimbriate at the margin. *Stamens* 16, in 2 rows of 8 each; *placentas* 2–3, distinctly intruded. *Capsules* 1½ in. long, very slender, erect, valves membranous.

The complete elaboration of this interesting little species which has puzzled Indian botanists since 1877 when it was first obtained by Dr. King, is largely due to the efforts of Surgn.-Capt. Cummins of the Medl. Staff who met with it when stationed at Gnatong in 1893, and who has assisted the writer in preparing a description. The ripe fruits show that it is undoubtedly a *Cathcartia*; the valves dehisce to the base while the stigmatic rays are opposite the placentas. It differs however from the original *Cathcartia villosa* in having ripe seeds without a crested raphe, in having a distinct style, and a much smaller stigma. It must prove a welcome addition to western horticulture when its seeds are at length introduced to Europe.

3. CATHCARTIA POLYGONOIDES *Prain*; glabrescent, rootstock slender clothed with sheaths; stems slender strigose; radical leaf solitary persisting long-petioled, cauline leaves 2–3, lower long-petioled uppermost sessile clasping, ovate-oblong obtuse base cuneate, truncate or slightly cordate, margins entire or slightly incised crenate, sparingly hairy on both surfaces; flowers small blueish-white; style distinct, stigma small 2-3-lobed.

CHUMBI: Sham-chen, *Dungboo!* Put-lo and Ling-moo-tong, *King's Collectors!*

Stem 6–15 in. simple; *leaves* $1\frac{1}{4}$–2 in. by $\frac{1}{2}$–$\frac{3}{4}$ in; radical petioles 3 in., lower cauline petioles 1–4 in. long. *Flowers* solitary 1 in. diam. nodding, pedicels long slender; *petals* narrowly lanceolate apex acute margin entire; *stamens* 16 in 2 rows of 8 each; *placentas* 2–3.

The flowers and unripe capsules of this plant are so remarkably like those of *C. lyrata* that there would seem no room for doubt as to its generic position. But it is at the same time remarkably like a small form of a plant from Yunnan described by M. Franchot as *Meconopsis betonicaefolia* [*Plantae Delavayanae*, 42, t. 12 (1889)] of which it has all the habit and, though on a smaller scale, exactly the foliage. A final judgment on both *Cathcartia polygonoides* and *Meconopsis betonicaefolia* can therefore only be given when ripe fruit of both plants has been received. The *specific* differences between the two plants are the fewer (16) stamens in the Chumbi plant than in the Yunnan one, which has 64; the narrower much smaller petals; and the smaller ovary and stigma As regards stigma *Meconopsis betonicaefolia* more nearly approaches *Cathcartia villosa*, but (like the two species now described) it has a long style; it has also more stamens (64 in 2 rows of 32 each in place of 32 in 2 rows of 16 each as in *C. villosa*). The ovary and unripe capsules of *Meconopsis betonicaefolia*, *Cathcartia lyrata* and *C. polygonoides* are remarkably similar; knowing that one of them is a *Cathcartia* the writer thinks it possible that the other two may eventually prove to be members of the same genus.

7. (4.) CHELIDONIUM TOURNEF.

Perennial glaucous herbs with yellow juice. Radical leaves petioled few erect or many rosulate, cauline few scattered, or 0, floral 0, or 2 terminal subopposed, or several near apex scattered. Flowers in fascicled or corymbose cymes. Sepals 2, petals 4, yellow or orange, convolute, stamens numerous, ovaries linear rarely ovate, 2-(rarely 3–4)-valved; style distinct stigma 2-lamellate lobes erect alternate with placentas, sinuses not projecting into arms. Capsule slender cylindric, rarely ovate, valves dehiscing throughout their length. Seeds shining smooth or opaque pitted, not scrobiculate, raphe crested. Species 9; 7 Chinese, of which 1 (*C. japonicum*) extends to Japan, another (*C. majus*) occurs also in Japan, Mongolia and Dahuria, extends westward to Britain and is naturalised in N. America; 1 North American; 1 Himalayan.

In the *Flora Indica* (1855) Sir J. D. Hooker and Dr. Thomson founded a genus *Dicranostigma* on the Indian species here dealt with. This species (*Dicranostigma lactucoides*) was however subsequently referred to *Stylophorum* by Mr. Bentham and Sir J. D. Hooker [*Gen. Pl.* i. 53 (1862)], by M. Baillon [*Hist.* iii. 114 (1871)] and again by Sir J. D. Hooker and Dr. Thomson [*Flor. Brit. Ind.* i. 119 (1872)]. More recently Messrs. Prantl and Kundig have suggested [*Engler, Natür. Pflanzenf.* iii. i. 139 (1891)] that *Dicranostigma* should rather be referred to *Hylomecon* Maxim. [*Prim. Fl. Amur.* 36, t. 3 (1858)] a genus founded on a plant that was originally [*Thunbg, Flor. Japon.* 221 (1784); *Sieb. & Zucc. Abh. Acad. Muench.* iv. ii. 169 (1846)] referred to *Chelidonium*, but that was at a later date [*Miquel, Prolus. Flor. Japon.* 199 (1867)] included in *Stylophorum*; this genus Mr. Prantl would reinstate. The view expressed by Prantl and Kundig is undoubtedly more tenable than that of the other authors quoted; at the same time if the method of limitation adopted by them be accepted it would be more advisable to retain *Dicranostigma* also as a genus. In any case the name of the conjoint genus suggested by Prantl and Kundig must be *Dicranostigma*, not *Hylomecon*. But the species in question, formerly very inadequately known, has been recently communicated by Mr. Duthie from Kamaon (its original locality) and by the collectors of the Calcutta garden from Phari in the Eastern Himalaya. A study of these specimens and of the material of the allied groups *Stylophorum* and *Hylomecon*, preserved in the national Herbaria at Kew and at the Jardin des Plantes, Paris, shows however that it is impossible to accord generic rank to any of them, or to separate them satisfactorily from each other or from *Chelidonium*. A detailed review of the species belonging to this widened *Chelidonium* will be found in the *Bulletin* of the Boissier Herbarium.

1. CHELIDONIUM DICRANOSTIGMA *Prain.* Dicranostigma lactucoides *H. f. & T. Flor. Ind.* 255 (1855); *Walp. Ann.* iv. 272 (1857). Stylophorum lactucoides *Baill. Hist. Pl.* iii. 114 (1871); *H. f. & T. Flor. Brit. Ind.* i. 119 (1872).

N.-W. HIMALAYA: Kamaon, *Strachey and Winterbottom* n. 3! *Duthie* nn. 2699! 3819! 5326! EASTN. HIMALAYA: Phari, *King's Collector!*

Nearly allied to *Chelidonium Franchetianum* Prain [in *Bull. Herb. Boiss.* ined.] and *C. leptopodum* Prain [Glaucium leptopodum *Maxim. Mel. Biol.* ix. 714 (1876)], which belong equally to the section *Dicranostigma*. From both it differs in having large stigmatic lobes, softly hairy capsules, and simple cymes. The section to which these species belong differs from the remaining *Chelidonia* is having a glaucioid habit—*i. e*, radical leaves many rosulate, cauline 0, floral apical all scattered.

On a new species of RENANTHERA.—*By* G. KING *and* D. PRAIN, *Royal Botanic Garden, Calcutta.*

[Read July, 3rd.]

Some years ago Lieutenant E. J. Lugard sent to the Calcutta Herbarium, for identification, some dried flowers and a living plant of what was evidently a species of *Renanthera.* The living plant unfortunately soon died in the uncongenial climate of Calcutta; the dried flowers were, however, sufficient to show that the plant probably belonged to a species near *R. coccinea,* Lour. Last year Lieutenant J. B. Chatterton was kind enough to send several plants of the same orchid to the Calcutta Garden, which were promptly transferred to the more suitable climate of the Cinchona Plantation in Sikkim. These plants flowered a few weeks ago and there is now no doubt that they belong to an undescribed species which from the resemblance of its flowers to the extended wings of a brilliantly coloured butterfly we now name *R. Papilio.* For a description of the flowers, drawn up from living specimens, we are indebted to Mr. R. Pantling, of the Cinchona Plantation, who has also made a beautiful coloured drawing of the plant.

RENANTHERA PAPILIO, n. sp. King and Prain. *Leaves* loriform, 2 to 2·5 in. long and about ·5 in. broad; their apices blunt and unequally lobed. *Inflorescence* 9 to 10 inches long, laxly racemose, or rarely panicled, on stalks of about equal length or longer, the bracts small, the stalked ovary about 1 in. long. *Dorsal sepal* linear-oblong, contracted below the blunt sub-cucullate apex, ·75 in. long. *Lateral sepals* twice as long as the dorsal, narrowly elliptic, flat, with undulate edges, the inner margins touching above the slender twisted claws; the apices sub-acute and divergent. *Lateral petals* ·5 in. long, spathulate, slightly incurved. *Lip* with acuminate-side lobes each with a small rounded basal auricle, the middle lobe broadly ovate, concave, its apex acute and pointing forwards, the base auricled. *Spur* short and blunt, with two erect toothed divergent plates near its mouth. *Column* minutely ciliate behind the anther; *stigma* with a thin deflected transparent lip.

Assam.

The colour of the flowers is a brilliant scarlet with a tinge of lake. The toothed plates of the spur end abruptly at the base of the middle lobe of the lip and immediately in front of their termination there are three blunt tooth-like processes. In its habit and the colour of its flowers the species resembles *R. coccinea,* Lour., but the flowers are larger and the lobing of the lip and the shape of the lateral sepals are very different.

On some New Orchids from Sikkim.—By G. King *and* R. Pantling.

The publication, in Sir Joseph Hooker's *Flora of British India*, of his account of the Orchids of the Empire marks an era in the study of this most interesting Natural Family. Prior to the issue of Sir Joseph's account of the group, it was extremely difficult to identify any Indian orchid that did not happen to have had a figure of itself published in some horticultural or botanical work. *Now* the work of determining the name of a species has been made comparatively easy; and the facilities which have thus been provided have stimulated local research. In the present paper we offer to the Society descriptions of thirty-three new species—twenty belonging to the Tribe *Epidendreæ*, eight to the Tribe *Vandeæ*, three to the *Neottieæ*, two to the *Ophrydeæ*—which have been discovered in Sikkim within the past few years.

Epidendreæ.

MICROSTYLIS, Nutt.

Microstylis Maximowicziana, n. spec. *Rhizome* 2 to 4 in. long, with scattered root fibres and bearing a leafy pseudo-bulb 3 or 4 in. long. *Leaves* 4 or 5, elliptic to elliptic-lanceolate, acute, tapering to the sheathing base, slightly oblique, 5 to 6 in. long. *Raceme* about 6 in long with numerous green flowers nearly ·2 in. in diam., the stalk of the raceme 4 to 5 in. long. *Floral bracts* linear-lanceolate, equal to or exceeding the stalked ovary. *Sepals* oblong, blunt, their margins recurved, the lateral broader than the dorsal. *Petals* linear, all reflexed, the lip hood-shaped; its apex contracted, thickened and slightly crenate, and with two minute teeth above the pit; the side lobes subfalcate, blunt. *Arms* of the *column* broad, overlapping and hiding the anther, the stigma occupying the whole face of the column. *Lip* of anther truncate.

Sikkim: On the Mungpoo Cinchona Plantation, alt. 2,000 to 4,000 feet; flowers in July.

The species is self-fertile.

OBERONIA, Lindl.

Oberonia falcata, n. spec. *Stems* caulescent, tufted, 3 in. long. *Leaves* falcate, acute 1 to 2 in. long, and ·25 in. broad. *Racemes* almost sessile, erect, 2 to 3 in. long; the flowers yellowish-green, minute, very numerous and sub-verticillate. *Flower-bract* ovate, erose, equal to and sheathing the stalked ovary. *Sepals* broadly ovate, entire, reflexed. *Petals* linear-oblong, blunt, entire. *Lip* twice as long as the sepals, broadly oblong, flat except for a slight depression below the column; the side lobes short, subulate, spreading; the apex deeply bifid, the lobes oblong-acute, slightly divergent at their apices. *Column* with two fleshy wings. *Anther* membranous; the pollinia ovate, flattened and of a dark orange colour.

Sikkim: at Labha, elevation about 6,000 feet? In flower in July. (Both locality and elevation are however doubtful).

This belongs to same group as *O. caulescens*, Lindl. and *O. Wightiana*, Lindl.

OBERONIA LONGILABRIS, n. spec. *Stems* caulescent, slightly tufted, erect, slender, 2 to 3 in. long. *Leaves* narrowly ensiform, acute, 1 to 1·5 in. long, and ·2 in. broad. *Racemes* slender, 2·5 to 3·5 in. long, nodding; their stalks ·5 to 1·25 in., ebracteate. *Flowers* minute, rather sparse, green. *Bract* lanceolate, erose, much exceeding the stalked ovary. *Sepals* ovate, entire. *Petals* linear, blunt. *Lip* oblong, three times as long as the sepals, with two small rounded lobes at the very base, the apical lobes broadly lanceolate, sub-divergent, acute, the sinus apiculate, the surface of the lip with a lanceolate depression extending from near the sinus to the column and there becoming deeper. *Column* with small stout wings. *Pollinia* orange.

Sikkim: at Songchongloo, elevation 6,000 feet; in flower in July.

A species near *O. caulescens*, Lindl.

OBERONIA MICRANTHA, n. spec. Acaulescent, height of whole plant 2·5 inches. *Leaves* narrowly-ensiform, sub-acute, ·5 to 1·5 in. long, and from ·1 to ·15 in. broad. *Racemes* about 1·25 in. long, on very short bracteate stalks. *Flowers* numerous, very minute, verticillate. *Bracts* linear-lanceolate, erose, equal to or slightly exceeding the ovary. *Sepals* broadly ovate, entire, spreading, minutely papillose externally. *Petals* narrower than the sepals, ovate, entire, recurved. *Lip* in general outline sub-rotund divided into a basal and apical part by deep lateral sinuses: the basal part concave, fleshy, its edges almost entire; the apical part transversely elliptic, thinner than the basal, with an acute apiculus and irregularly erose-dentate edges.

Sikkim: at Tendong, elevation 6,000 feet; in flower in July.

The nearest allies of this very distinct little species are *O. myriantha*, Lindl. and *O. demissa*, Lindl.

OBERONIA PARVULA, n. spec. Acaulescent, not tufted or very slightly so: the height of the whole plant 1·25 to 2 in. *Leaves* two or three, ·5 to nearly 1 in. long, and ·12 to ·25 in. broad, lanceolate, acute. *Raceme* ·75 to 1 in. long, on a slender stalk about half as long. *Flowers* very minute, densely crowded, not verticillate. *Bract* lanceolate, as long as the stalked ovary. *Sepals* ovate, entire, the laterals larger and wider-spreading than the dorsal, and keeled. *Petals* linear, truncate, shorter than the sepals, entire, pale yellow and transparent like the sepals. *Lip* reddish brown, with broad reniform base having a lateral sinus and a short convergent horn at each side at its anterior end: the apical lobe broadly oblong, deeply bifid, the lobes lanceolate and slightly convergent, and the sinus narrow, not triangular and with a concave emarginate apex. *Stigma* concave.

Bhotan: at Guru-bathan, at an elevation of about 1,500 feet; in flower in February.

A very distinct species.

OBERONIA LOBULATA, n. spec. Acaulescent, not tufted. *Leaves* about four, large, oblong, sub-acute, 1·25 to 3 in. long, and ·4 to ·5 in. broad. *Raceme* 4 in. long, on a winged ebracteate peduncle about half as long, much decurved. *Flowers* distant, minute, green. *Bracts* broadly oblong, the apex convex and minutely erose equalling and sheathing the sessile ovary. *Sepals* ovate, acute, entire, reflexed; the *petals* similar but narrower. *Lip* broadly triangular with irregularly erose margins, the apex with a broad shallow sinus and two short blunt lobes. *Stigma* convex ?

Sikkim: in the valley of the Teesta, at an elevation of about 1,000 feet; in flower in October.

Collected only once. A remarkable species with the pollinia encased within the anther cells and not free as is usually the case in the genus *Oberonia.*

OBERONIA PRAINIANA, n. spec. Acaulescent, and slightly tufted *Leaves* very fleshy, falcate, sub-acute, ·5 to ·75 in. long, and ·25 in broad. *Raceme* slender, many times longer than the leaves, erect, 4 in. long: stalk of the raceme attached to the uppermost leaf, minutely bracteolate, filiform, about 1 in. long. *Flowers* of a warm brown colour, verticillate, very minute. *Bract* oblong, sub-entire, equal to and embracing the stout sessile ovary. *Sepals* oblong, blunt, all much revolute. *Petals* elliptic-lanceolate, spreading, deeply serrate. *Lip* triangular-oblong with a circular nectar-bearing pit near its base and under the column, the apex blunt, the margins deeply erose-dentate. *Pollinia* 2 pairs, orange-coloured.

Sikkim: in the Teesta Valley, at an elevation of about 1,000 feet; in flower in July.

A very distinct species remarkable or the great length of the slender inflorescence in proportion to the leaves, and for its unlobed but deeply erose dentate lip.

DENDROBIUM, Swartz.

DENDROBIUM CŒSPITOSUM, n. spec. Pseudo-bulbs tufted, narrowly conical, from ·5 to 1 in. long. *Leaves* linear-oblong; the apex sub-obtuse, minutely and obliquely emarginate, about 1·5 in. long and ·25 in. broad. *Racemes* terminal 1 to 2 in. long, the rachis slender, minutely bracteolate, 8- to 12-flowered. *Sepals* and *petals* sub-equal, narrowly lanceolate acute, ·25 in. long, slightly spreading. *Lip* slightly shorter, fleshy obovate-oblong, decurved at the base, otherwise flat, without lateral lobes, the margins ciliolate near the base; disc much thickened and deeply 3-grooved; mentum concave. *Anther* papillose; *pollinia* thin.

Sikkim: in the Naru Valley, at an elevation of 6,000 feet; in flower in June.

This species belongs to the group *Stachyobium* and is allied to *D. alpestre*, Royle, but that species has a lip with incised-serrate lateral lobes, a small crisped terminal lobe, and a central bi-lamellate disc. It is also allied, but not so closely, to *D. eriæflorum*, Griff.

DENDROBIUM PAUCIFLORUM, n. spec. Stems 2 to 3 feet long, as thick as a goose-quill, branching, and tapering towards each extremity, pendulous, smooth when young but slightly grooved when old. *Leaves* linear-lanceolate, obliquely and minutely emarginate at the apex 3 to 4 in long, and ·5 to ·75 in. broad. *Racemes* lateral about ·5 in. long, 1–4-flowered; flower-bract ovate, blunt ·1 in. long. *Flowers* ·75 in. long. Lateral *sepals* ovate; the dorsal narrower, blunt *Petals* ovate-lanceolate, ciliolate. *Lip* ·5 in. long, oblong, clawed: basal lobes narrow, directed forwards, fringed, the part between these lobes much thickened and bearing on its surface 3 raised lines; terminal lobe flat, hispid with no central thickening or lines; *mentum* with a large nectar-secreting chamber, its upper (posterior) portion partially covered by the wings from the sides of the column.

Sikkim above Engo, at an elevation of about 4,000 feet; in flower in June.

The flowers are of a golden yellow colour, the sepals and petals being broadly margined with crimson. The apical lobe of the lip is spotted with red. Its nearest ally is probably *D. sphegidoglossum*, Reichb. fil. The position of the basal lobes of the lip is so far forward that they are really not basal but lateral.

BULBOPHYLLUM, Thouars.

BULBOPHYLLUM CORNU-CERVI, n. spec. Pseudo-bulbs globular, touching, only ·1 in. in diam. *Leaf* coriaceous, sub-sessile elliptic or elliptic-rotund tapering slightly to the base, 1 to 1·5 in. long and ·6 to ·8 in. broad. *Raceme* 1 4 to 1·75 in. long, on a sub-erect stalk rather longer and stouter than itself and bearing at intervals a few minute bracteoles. *Flowers* rather distant, about ·25 in. long. Dorsal *sepal* oblong, blunt, lying parallel to the column; the laterals broader, flat, with involute margins. *Petals* half as long as the sepals, lanceolate, 1-nerved (in fresh flowers). *Lip* fleshy, sub-rotund with lateral sinuses; the basal portion thick concave; the anterior portion thinner and much deflexed so that its upper surface is convex, the edges entire. *Column* very short, with stout 2-3-fid arms variable in shape; *mentum* flat, narrowing outwards, with a stout raised mesial line which begins as a hook at the lower margin of the stigma. *Anther* flat; *pollinia* small.

Sikkim: near the base of the Engo ridge at an elevation of probably about 2,500 feet: flowering in July.

The sepals of this are green with reddish-brown margins; the lip is yellow with a touch of dull red at the base. The nearest ally of this seems to be *D. alcicorne*, Par. & Reichb. fil.

BULBOPHYLLUM CLARKEANUM, n. spec. *Rhizome* long, about the thickness of a crow-quill, sending up at intervals of about an inch and a half, ovoid-globose obtuse pseudo-bulbs ·35 to ·6 in. long. *Leaf* narrowly elliptic, slightly notched at the apex, sessile, about 1 in. long and ·5 in. broad. *Scape* ·5 to 1 in. long, slender, with 3 to 5 small sheaths 2-3-flowered. *Flowers* ·3 in. long. their pedicels ·2 in. long, borne at the apex of the scape. *Sepals* sub-equal, lanceolate-acuminate, their apices thickened. *Petals* about one-third of the length of the sepals, broadly ovate, obtuse, 3-nerved. *Lip* ovate, acute, decurved, the upper surface convex with an elongated central pit; the edges thin erose. *Column* with long projecting spurs.

Western Dooar of Bhotan; in the Kumai Forest near the Jaldacca River, at an elevation of about 1,500 feet: flowering in June.

This is allied to *B. stenobulbon*, Par. & Reichb. fil., but has different pseudo-bulbs and leaves.

BULBOPHYLLUM CYLINDRICUM, n. spec. *Rhizome* long, creeping, ·1 in. thick, with numerous sheaths towards the apex, bearing at distances of about two inches cylindric pseudo-bulbs truncate at the apex and 1 to 1·25 in. long. *Leaf* narrowly oblong, sessile, blunt, faintly notched at the apex, 2·5 to 3 in. long, and ·4 to ·5 in. broad. *Scape* about as long as the pseudo-bulb, slender, minutely bracteolate. *Flowers* 3 to 5, sub-umbellate, about ·25 in. long. *Sepals* lanceolate, caudate-acuminate, the dorsal shorter than the laterals. *Petals* about one-fourth of the length of the lateral sepals, ovate, sub-acute, 1-nerved. *Lip* oval, blunt, flat, its margins thin, entire, much reflexed. *Column* very stout, with short spurs; *mentum* conical. *Anther* with a raised fleshy mid-area, its lip truncate; *pollinia* divergent.

Sikkim: Mungpoo, at an elevation of about 3,000 feet: flowering in June.

This is also closely allied to *B. stenobulbon*, Par. & Reichb. fil. of which it has the leaves and pseudo-bulbs, but the flowers are different. It is likewise allied to *B. Clarkeanum.*

BULBOPHYLLUM EBULBUM, n. spec. *Rhizome* ·15 in. thick, smooth, bearing leaves at distances of three or four inches. *Pseudo-bulbs* none. *Leaves* with long petioles, the blades oblong-lanceolate, tapering to base and apex, about 7 in. in length and 1 to 1·25 in. broad: *petiole* 1·5 to 2 in., channelled. *Raceme* erect, rising immediately in front of a leaf, many-flowered, about 3 in. long, its stalk about half as long, bracteate. *Flowers* rather distant, ·25 in. long. *Sepals* lanceolate, acuminate, (1-nerved ?), the dorsal shorter. *Petals* linear-lanceolate, 1-nerved, half as long as the lateral sepals. *Lip* oblong, stipitate, deflexed from the middle, blunt, entire, longer than the lateral petals. *Column* stout, with mentum twice as long as itself and bearing a large swelling below the stigma. *Anther* thickened down the centre, entire.

Sikkim: at Sivoke, elevation 1,000 feet; in flower in July.

The nearest ally of this is undoubtedly *B. apodum*, Hook, fil. from which it is however well separated by the shape of the leaf, and the non-auriculate lip.

BULBOPHYLLUM LISTERI, n. spec. Pseudo-bulbs oblong-ovate, compressed, ·35 in. long, arranged alternately and close together on a thread-like rhizome. *Leaf* fleshy, linear-oblong; sub-acute, sessile, 1 to 1·5 in. long. *Flowers* ·125 in. long, solitary from the bases of both old and new pseudo-bulbs, and much shorter than the latter, the shortly-stalked ovary enveloped by several shrivelled bracts. Dorsal *sepal* ovate-lanceolate, blunt; the laterals a little longer, cohering by their lower margins nearly to the tips and forming a kind of trough in which the lip lies, their margins ciliolate. *Petals* fleshy, ovate, erose at the apex, minutely ciliolate in the middle. *Lip* lanceolate almost flat, the apex alone slightly decurved, the base constricted into a short claw, the upper surface with a thickened yellow mesial line. *Column* very short, its spurs long, slender, up-curved. The galeate *anther* with a filiform attachment to the column.

British Bhotan: at the Rumpti Lake, elevation 1,000 feet: flowering in March.

This remarkable species was discovered by Mr. J. L. Lister, of the Bhotan Cinchona Association, who gave it to Mr. Pantling. It is one of the most curious in the whole genus. The flowers are of a dull lake.

CIRRHOPETALUM, Lindl.

CIRRHOPETALUM DYERIANUM, n. spec. *Rhizome* ·1 inch thick. *Pseudo-bulbs* ovoid-globose, ·35 to ·5 in. long, touching or from ·25 to ·5 in. apart. *Leaf* fleshy, elliptic, blunt, sessile. *Scape* 2·5 in. long. filiform, pendulous, bracteolate only at the base, bearing 3 or 4 rather distant racemose flowers ·65 in. long, each with a lanceolate acuminate basal bract equally the slenderly pedicelled ovary. Dorsal *sepal* ovate, acute, the laterals two and a half times as long, linear-oblong, acuminate, slightly oblique, and somewhat incurved at their apices but not cohering. *Petals* equal to the dorsal sepal in length, ovate, acute, erose. *Lip* narrowly triangular with a deep mesial groove to near the apex. *Column* with short up-curved spurs; *mentum* twice as long as the column. *Anther* minutely papillose.

Sikkim: or the summit of Tendong, elevation 7,000 feet; in flower in August.

CIRRHOPETALUM SARCOPHYLLUM, n. spec. *Rhizome* ·15 in. thick, bearing at intervals of 3 or 4 inches small flat disc-like pseudo-bulbs, ·35 in. in diam. *Leaf* 4 to 9 in. long, pendulous, very coriaceous, oblong-lanceolate, sub-falcate, without visible nerves, contracted at the base to a thick cylindric petiole ·75 to 1 in. long. *Scape* 3 or 4 in. long, pendulous, with a few equidistant ovate-lanceolate acute sheathing bracts ·25 in. long and bearing at its apex an umbel of 3 to 7 shortly stalked flowers ·75 in. long. Dorsal *sepal* ovate-acuminate ·35 in. long, the laterals narrower, and twice as long, cohering for one-third of their length, free at the tips, glandular-puberulous. *Petals* oblong, falcate, acute ·2 in. long. *Lip* tongue-shaped, channelled below. *Column* with slender divergent spurs with a smaller tooth at the base of each: *mentum* stout with two parallel central raised lines.. *Lip* of *anther* recurved. *Pollinia* cuneate.

Sikkim: at Rishap, elevation about 2,500 feet; in flower in September.

The flowers are purplish speckled with yellow.

CHRYSOGLOSSUM, Blume.

CHRYSOGLOSSUM MACROPHYLLUM, n. spec. *Pseudo-bulb* sub-cylindric, thin, 6 in. long. *Leaf* plaited, oval, slightly narrowed at base and apex, 15 in. long and 7 in. broad: its petiole 8 in. long. *Raceme* about 6 in. long, many-flowered, its stalk about 12 in. long, sparsely bracteolate; *Flowers* ·5 in. across, their ovaries ·5 in. long, bracts lanceolate, reflexed, shorter than the ovaries. *Sepals* sub-equal, the dorsal lanceolate, the laterals falcate. *Petals* slightly broader than the sepals, falcate. *Lip* contracted into a claw at the base, mobile, oblong, abruptly decurved from the rounded basal lobes, the apex minutely emarginate and decurved: upper surface with two bold longitudinal minutely hispid lamellae running from the base to nearly the apex where they unite. *Mentum* half as long as the entire column. *Anther* with two projecting triangular wings. *Pollinia* 2, attached to a small viscid disc.

Sikkim: in the Chel valley, at an elevation of 4,000 feet; in flower in May.

This differs from any *Chrysoglossum* known to us in having a wingless column. The flowers have an unpleasant smell.

ERIA, Lindl.

ERIA FIBULIFORMIS, n. spec. *Pseudo-bulbs* crowded and often overlapping, much depressed, reticulate, ·5 in. in diam. *Leaves* membranous, in pairs, oblanceolate, sub-acute, sessile, the edges minutely ciliolate, 1·75 in. long. *Flowers* in pairs, ·25 in. long, their ovaries short, sigmoid, sub-campanulate. *Sepals* united to form a 2-lipped beaked sac, gibbous at the base. *Petals* oblong-lanceolate, sub-acute, obliquely curved, not quite so long as the calyx, their apices connivent above the very small lip, (1-nerved ?). *Lip* half as long as the petals, clawed at the base, its upper surface concave, the side lobes broad and rounded, the part beyond them contracted and with laciniate edges, the apex carunculate, a small retrose callus in front of the basal claw. *Mentum* twice as long as the column, tapering downwards. *Rostellum* very large and resting on the two lobes and upper margin of the stigma. *Anther* crested and tuberculate, its lip erose. *Pollinia* 8, barely cohering by their minute membranes.

Sikkim: in tropical valleys at the base of the hills, at Sivoke, &c.: in flower in October.

This belongs to the section *Porpax* and is allied to *E. Lichenora*, Lindl. and *E. ustulata*, Par. & Reichb. fil. Its sepals are united to form a curious 2-lipped sac, sparsely hispid externally. All parts of the flower are of a uniform dull red colour.

TAINIA, Blume.

TAINIA HOOKERIANA, n. spec. *Pseudo-bulbs* ovoid, tapering upwards, 2 to 3 in. long, rising close together from a stout rhizome, and enveloped in a bract which sheaths also the petiole nearly to its apex. *Leaf* plicate, oblong-lanceolate, tapering much to each end, 12 to 18 in. long and about 3 in. broad, its petiole somewhat shorter. *Raceme* about 10 in. long, its stalk about twice as long, glaucous, bearing two or three sheathing bracts near the base: floral bracts lanceolate, ·25 in. long. Flowers about 1 in. long, their ovaries ·75 in. *Sepals* and *petals* sub-equal, lanceolate, accuminate. *Lip* oblong with rather large blunt incurved side-lobes and a dilated sub-reniform apex apiculate in the centre; upper surface of the middle of the lip with 3 ridges which, beginning at the base as lines, pass into converging lamellae towards the apex; spur blunt, incurved, exceeding the sepals by ·12 in. *Column* winged. *Anther* with two bosses.

Sikkim; in the valley of the Teesta at an elevation of 1,000 feet; in flower in March.

The colour of the sepals and petals is greenish with brown lines: the lip is white, and its lamellae are yellow spotted with pink. The anther is pink and its bosses are dark red. The species is near to *T. viridifusca.* We have dedicated it to Sir Joseph Hooker.

CALANTHE, R. Br.

CALANTHE TRULLIFORMIS, n. spec. *Leaves* linear-lanceolate, acute, sessile, 9 to 12 in. long. *Raceme* about 9 in. long; its stalk about the same length, puberulous. *Flowers* 14 to 18, scattered, about 1 in. in diam.; floral bracts linear-lanceolate equal to or exceeding the stalked puberulous ovaries. Dorsal *sepal* ovate-lanceolate, narrowly acuminate ·75 in. long; lateral *sepals* lanceolate, falcate, longer than the dorsal. *Petals* linear, acute, shorter than the lateral sepals. *Lip* sessile, trowel-shaped, the base entire, the sides irregularly crenate-dentate, not lobed; the apex acuminate, entire: the upper surface with two converging lamellæ extending from its base midway to the apex: *spur* short, stout; its mouth triangular, its interior bristly. *Pollinia* in 4 clavate unequal pairs.

Sikkim: on Mahaldaram Peak: elevation 6,000 feet; flowering in in July.

A species allied to *C. puberula,* Lindl. but differing from that species in having sessile leaves and a lip without side lobes. The colour of the sepals and petals is brown with a mesial and marginal green lines. The lip is white, with a triangular pink mark at the base.

Vandeæ.

EULOPHIA, R. Br.

EULOPHIA GENICULATA, n. spec. *Leaves* about three and a half feet in length of which the petiole forms one-third, the blade linear-lanceolate, acute, plicate. Flowering *scape* about 18 in. long, clothed throughout with sheathing bracts 1 to 3 in. long, and bearing at its apex a 6- to 8-flowered raceme. *Flowers* 1 in. in diam., each with a lanceolate acute bract equalling the sub-sessile, cylindric ovary. Dorsal *sepal* elliptic, blunt: the two lateral elliptic-lanceolate, sub-acute.

Petals oblong, blunt, shorter than the sepals, connivent over the column. *Lip* oblong, with long shallow side-lobes, its body as far as the end of the side lobes with three to five parallel thickened nerves which end beyond the extremities of the side-lobes in a carunculate area on the truncate apical lobe: spur geniculate, short. *Anther* with a small 2-lobed lip.

Sikkim: in the valley of the Teesta: elevation about 1,000 feet: flowering in August.

The sepals of this are brown, the petals and lip pale yellow. The petioles of the two leaves form a pseudo-stem rather shorter than the scape, and they are enclosed within two sheaths about 9 inches long. This pseudo-stem is bound to the scape near its base by two short broad sheaths which originate from the tuber. The nearest ally of the species is *E. lachnocheila*, Hook. fil.

CYMBIDIUM, Swartz.

Cymbidium Munronianum, n. spec. Terrestrial. *Leaves* stiff, erect, ensiform, 16 to 20 in. long and ·75 in. broad, tapered into a petiole or not. *Racemes* stout, erect, about one foot long, about half being stalk, with two or three distant closely embracing sheaths 1 in. long. *Flowers* about 7 or 8, distant, 1 in. in diam., their bracts ·25 to ·35 in. long, lanceolate. *Sepals* and *petals* sub-equal, oblong-lanceolate, acute. *Lip* lanceolate (when flattened out), everywhere concave on the upper surface; the lateral lobes elongate and shallow, the body with two parallel smooth lamellæ in its centre ending with the side-lobes, the apical lobe narrow and reflexed. *Pollinia* 4, plano-convex, the gland narrow.

Sikkim: in the Teesta Valley on dry knolls: at an elevation of 1,500 feet: flowering in May.

The flowers of this species are sweetly-scented: the sepals and petals are straw-coloured and each has 5 dotted or streaked lines: the lip is white except its apical lobe, which is pale yellow transversely blotched with red. Its nearest ally is *C. ensifolium*, Swartz, under which it appears to be included by Lindley and other authorities. This Sikkim plant appears to us to differ very materially from the true Chinese *C. ensifolium.* We have dedicated the species to the late Mr. James Munro, for many years resident in Sikkim, and well-known, not only as a lover of plants, but as a man of great sincerity, and of unlimited kindness and hospitality.

Cymbidium Simonsianum, n. spec. *Leaves* linear, sessile, the apex acute and sub-oblique: length 3 feet or more: breadth ·4 in. *Raceme* 8 in. long, pendulous, shortly stalked, sheathed at the base by large imbricate bracts 1 to 2·5 in. long. *Flowers* about 10 to 12, sparse, their bracteoles very short. *Sepals* sub-equal, linear, slightly wider near the apex, about 1 in. long. *Petals* rather shorter than the sepals, connivent round the column. *Lip* with long shallow erect blunt entire side-lobes parallel with, and as long as, the column; the apical lobe ovate, apiculate, deflexed; lamellæ of the lip 2, stout, parallel, clothed with glandular hairs, ending abruptly with the basal lobes but continued partly into the apical lobe as thickened lines. *Pollinia* falcately ovoid, compressed; the gland large.

Sikkim: in the valley of the Teesta: elevation about 1,000 feet. Assam: locality unknown; flowers in August.

The flowers of this species are sweet-scented: the sepals and petals are white with a crimson central line; the lip is also white, but has oblique crimson lines on the lateral lobes, with large blotches of the same colour on the apical lobe: the column is of a very dark crimson, and the anther of a pale yellow colour. Specimens of this plant were sent many years ago from Assam by the late Dr. J. C. Simons, to whom the Calcutta Herbarium is indebted for numerous contributions of plants, and for a large number of drawings of orchids. The species is now dedicated to his memory.

CYMBIDIUM GAMMIEANUM, n. spec. *Leaves* linear, slightly narrowed to the base, the apex acute, 2 to 3 feet long and about ·75 in. broad. *Raceme* pendulous, about 12 in. long with a stalk about three-fourths as long, laxly or densely-flowered, the bracteoles minute, the stalk enveloped in large imbricate sheaths 3 to 4 in. long. *Sepals* linear-lanceolate or linear-oblanceolate, 7-nerved, 1·5 to 1·75 in. long and about ·45 in. broad. *Petals* linear-oblong, sub-falcate, slightly shorter than the sepals, 7-nerved. *Lip* about as long as the sepals, oblong, the side lobes shallow, elongate, acute, the apical lobe sub-orbicular undulate, puberulous, separated from the lateral lobes by a sinus; lamellæ of the lip 2, pubescent, parallel, but meeting and ending abruptly with the side lobes opposite the ciliolate sinus. *Column* slender, slightly winged. *Capsule* 2 in. long.

Sikkim: at elevations of from 5,000 to 7,000 feet: flowering in September and October.

The colour of the flowers in this species is a dirty yellow: the lip is of a brighter yellow and has brown lines on its side lobes. Individuals with flowers of a paler yellow are however very common, and these have usually densely-flowered racemes like *C. elegans*, Blume; while the plants with dirty yellow flowers have lax racemes suggestive of those of *C. longifolium*, Don. This species, although common in Sikkim; has hitherto remained un-named. We dedicate it to Mr.

J. A. Gammie, Deputy Superintendent of the Government Cinchona Plantation in Sikkim, whose work in the cultivation of the medicinal species of *Cinchona* and in the local manufacture of Quinine is so well-known and so highly appreciated. The species is allied to *C. Mastersii*, Benth. and *C. affine*, Warn.

SARCOCHILUS, R. Br.

SARCOCHILUS RETRO-SPICULATUS, n. spec. Leafless; the roots large, numerous and flat. *Scape* about ·75 in. long, bearing at its apex 1 or 2 green, minutely bracteolate flowers ·2 in. long. *Sepals* and *petals* sub-equal, linear-lanceolate, wide-spreading, the laterals inserted on the sides of the lip. *Lip* sessile, linear-lanceolate, the apex with a retrorse tooth; the base sub-gibbous, side lobes none: the spur globose, its mouth contracted. *Column* very short. *Pollinia* 4: the caudicle short, dilated below the pollinia, the gland ovate.

Sikkim: at elevations of about 5,000 feet; flowering in June.

A very inconspicuous species, remarkable for the curious retroflexed apical spicule-like appendage of the lip.

SARCOCHILUS CREPIDIFORMIS, n. spec. A minute leafless plant with comparatively large spreading roots. *Raceme* erect, ·35 in. long, flowers ·15 in. long, bracteate, distichous, opening singly. *Sepals* sub-equal, ovate, blunt. *Petals* shorter than the sepals, lanceolate. *Lip* sessile on the column, forming a roundish cup with entire edges, about equalling the dilated horizontal spur which is pilose just inside its mouth. *Column* very short. *Anther* thin, with a slightly deflexed fleshy lip. *Pollinia* 4, all attached to a single thread-like caudicle: gland ovate. *Ovary* long, sub-sessile: *fruit* 1 in. long, cylindric.

Sikkim: in tropical valleys: flowering in September.

The sepals and petals of this curious little plant are greenish, the lip is white, and the stigma has purple margins. It is named from the resemblance of the combined lip and spur to a slipper or last.

SARCOCHILUS BIMACULATUS, n. spec. *Stem* very short. *Leaves* linear-oblong, narrowed to the base, sub-falcate, the apex obliquely bifid, 2 in. long, and 35 in. broad. *Raceme* stout, ·75 in. long, compressed, and with persistent triangular bracts. *Flowers* confined to the upper half of the rachis, distichous, ·3 in. in diam., sessile. *Sepals* sub-equal, ovate-lanceolate, apiculate, the laterals attached to the base of the column. *Petals* shorter than the sepals, ovate, sub-acute. *Lip* springing at right angles from a short mentum, and lying parallel to the column; its side lobes narrow, elongate, falcate, acute at the apex: apical lobe triangular, very fleshy and with two flat calli at its base where the side lobes end: the centre of the body of the lip with larger elongate calli near its union with the mentum. *Stigma* large. *Rostellum* small. *Pollinia* ovoid, the caudicle oblanceolate; the gland very small, ovoid. *Capsule* 1·5 in. long, triquetrous.

Sikkim: in the valley of the Teesta; elevation about 1,500 feet: flowering in July.

The flowers are white, with two blotches of brown on the calli of the lip. They open singly and smell of almonds.

SACCOLABIUM, Blume.

Saccolabium pseudo-distichum, n. spec. *Stems* slender, 6 to 9 in. long, slightly branching. *Leaves* fleshy, lanceolate, the apex finely and minutely bifid, ·5 to ·75 in. long, and ·2 to ·25 in. broad. *Peduncle* ·35 in. long, sub-umbellately 5- or 6-flowered. *Flowers* ·3 in. in diam. bracts minute. *Sepals* and *petals* sub-equal, oblanceolate-oblong. *Lip* with a wide hemispheric spur; side lobes absent; terminal lobe broadly cordate, blunt, entire, fleshy, concave, deflexed, quite without callus. *Column* very short. *Pollinia* 2, entire, ovoid-globose; gland deeply 2-lobed.

Sikkim: at elevations of 6,000 to 8,000 feet: flowering time August to October.

This grows along with *S. distichum* Lindl. to which it is closely allied. As in that species the sepals and petals are greenish or yellowish with purple spots; the lip in this is yellow, except the terminal lobe which is orange. The chief distinction between the two is to be found in the lip which, in this, is entirely without calli of any kind; while, in *S. distichum*, the lip has two large calli situated at its base. The times of flowering of the two are moreover separated by three months.

Neottieæ.

CHEIROSTYLIS, Blume.

Cheirostylis Franchetiana, n. spec. *Roots* short tubercular. *Stem* 6 to 9 in. long, the nodes slightly swollen. *Leaves* few, scattered, glabrous; linear-lanceolate and much reduced in the flowering plant; in the young plant ·25 to ·35 in. long, ovate and shortly petiolate. *Raceme* pubescent, 1- to 2-flowered. *Flowers* ·25 to ·3 in. long, with ovate bracts shorter than the ovary. *Sepals* oblong, curved, connate for one-third their length; the dorsal concave, shorter than the laterals. *Petals* broad, sub-quadrate, with an oblique central nerve. *Lip* slightly exceeding the sepals, abruptly deflexed from a saccate base; the limb very shortly clawed, deeply divided into two linear obliquely sub-acute rather divergent lobes. *Column* with two pyriform processes immediately beneath the rostellum. *Anther-beak* decurved. *Pollinia* sub-obovate, divergent when released from the anther; the caudicle acuminate and the gland oblong.

Sikkim: above Sureil; elevation 6,500 feet: flowering in August.

A very distinct species, named in honour of M. Franchet, the distinguished French Botanist who has so successfully elaborated the extraordinarily rich collections made by the Abbé Delavay in the highlands of South-Western China.

GOODYERA, R. Br.

Goodyera Hemsleyana, n. spec. Height of entire plant 6 to 10 in. of which 3 in. are spike: roots few, thick. *Leaves* 3 to 5, scattered, unequal, broadly ovate, acute, glabrous like the stem, dark green with white nerves ·8 to 1·8 in. long and ·5 to 1 in. broad. *Flowers* subsecund, ·5 in. long, the bracts equalling the ovaries. *Sepals* 3-nerved, white with pink lips, the laterals ovate-acuminate, the dorsal oblong-lanceolate and clothed externally with long sparse hairs. *Petals* oblong-lanceolate, falcate, 3-nerved. *Lip* oblong with a sharp tooth at each side of the mouth of the sub-saccate base; the limb oblong entire, obtuse, the lamellæ scabrid. *Column* beaked. *Pollinia* elongate-obovate, with a short caudicle and a long narrow lanceolate pointed gland.

Sikkim: on Senchal; elevation 7,000 feet: flowering in July.

This differs from *G. vittata*, Benth., notably by its laxly hairy sepals, and by the scabrid lamellæ of the lip. Dedicated to Mr. W. B. Hemsley, F.R.S., formerly Assistant for India, now Principal Assistant, Herbarium, Royal Gardens, Kew.

GASTRODIA, R. Brown.

Gastrodia Dyeriana, n. spec. Rhizome short, twice as thick as the stem, horizontal, with slender spreading roots. *Stem* about the thickness of a crow-quill, 12 to 15 in. long, bearing sheathing bracts ·5 in. long at intervals. *Flowers* 3 or 4 near the apex of the stem, ·5 or ·6 in. long, brownish, nodding. *Sepaline tube* cylindric, glabrous, the mouth 3-lobed. *Petals* minute, sub-rotund, entire, inserted on the sepaline tube near the bases of two of its sinuses. *Lip* as long as the column, but shorter than the sepaline tube, ovate-lanceolate, clawed, flat with undulate-crenate edges and with 4 parallel thickened lines from the base to nearly the tip: claw short, and bearing two sub-globular calli. *Column* with winged sides, the apex truncate and 4-toothed; *pollinia* narrowly and obliquely ovoid.

Sikkim: at elevations of 7,000 feet; flowers in August.

This is allied to *G. exilis*, Hook. fil., but that species has smaller flowers with fimbriate (or glandular) lateral petals and a lip with 2 long wing-like central lamellæ. This is less closely allied to *G. orobanchoides*, Benth., which has erect flowers and a ventricose sepaline tube. It agrees with *G. elata*, Blume, in having two callosities on the claw of the lip. Dedicated to Mr. W. T. Thiselton Dyer, F.R.S., C.M.G., C.I.E., Director of the Royal Gardens, Kew.

Ophrydeæ.

HABENARIA, Willd.

HABENARIA BIERMANNIANA, n. spec. Height of plant 9 to 15 in.; tubers cylindric-ovoid, 1·25 in. long, sparsely hairy, *Leaves*, 4 or 5, cauline, scattered, amplexicaul, lanceolate, acute, boldly nerved, 2 to 3 in. long. *Spike* 4 in. long, rather sparsely flowered; bracts linear-lanceolate, acuminate, exceeding the sessile and scarcely beaked ovaries. *Flowers* ·3 in. long. *Sepals* and *petals* sub-equal; *sepals* ovate, lanceolate, with oblique bases, concave, sub-acute, cohering and, with the triangular-lanceolate petals, forming a hood from the base of which the lip and spur projects. *Lip* fleshy, linear-oblong, tapering slightly to the obtuse apex, the side-lobes minute and tooth-like; spur about as long as the lip, curved, sub-obovate, dorsally compressed. *Column* arching over the mouth of the spur. *Caudicles* slightly shorter than the obovoid pollinia; gland short, linear-oblong.

Sikkim: on Sinchal; at an elevation of 8,000 feet: flowering in July.

A very distinct species dedicated to the memory of the late Adolf Biermann, for many years resident on the Government Cinchona Plantation in Sikkim, and who died as Curator of the Botanic Garden, Calcutta.

HABENARIA CUMMINSIANA, n. spec. Height of plant about 9 in. *Leaves* 2 to 4, unequal, crowded in the lower part of the stem with a smaller one a little below the spike, broadly elliptic to lanceolate, rather thick, 2 to 3 in. long and 1 to 1·5 in. broad. *Stem* angled between the small uppermost bract-like leaf and the base of the spike. *Spike* 3 in. long, rather densely-flowered, bracts longer than the slender beaked ovaries, their edges ciliolate. *Flowers* (to the tip of the spur) ·75 in. long. *Dorsal sepal* ovate ·25 in. long; the *laterals* narrower, wide-spreading, their edges ciliolate, ·4 in. long. *Petals* fleshy, slightly exceeding the dorsal sepal, triangular, sub-falcate, the inner edge irregularly crenate near the base, the outer edge entire, the apex sub-acute, the base truncate. *Lip* very fleshy, without side-lobes, longer than the lateral sepals, almost cylindric, abruptly deflexed from the thin flattened base (? claw), the surface of the cylindric part slightly carunculate:

spur slender curved, longer than the ovary, slightly compressed laterally. *Column* very short: stigmas large, tapering towards the entrance to the spur. *Pollinia* cylindric, slightly clavate, rather longer than their caudicles and attached to them at half a right angle; gland small, subrotund.

Sikkim: at Gnatong; elevation 11,000 feet: flowering in July; collected by Mr. Pantling and also by Dr. Cummins, Surgeon to the detachment of troops stationed near the Thibet frontier, to whom we have dedicated the species.

This belongs to the section *Hologlossa* and is allied to *H. pachycaulon*, Hook. fil., but it is perfectly distinct from that species.

Contributions to the Theory of Warning Colours and Mimicry, No. I. Experiments with a Babbler (Crateropus canorus).—*By* FRANK FINN, B.A., F.Z.S., *Deputy Superintendent of the Indian Museum.*

Not long after my arrival in Calcutta in October 1894, I commenced some researches on the common "warningly coloured" butterflies of the locality, in the hope of supplying some of that experimental proof of the unpalatability of such species, the insufficiency of which Professor Poulton (the Colours of Animals, p. 227) so justly deplores. My most complete experiments were made with the common Babbler *Crateropus canorus*, a representative and abundant insectivorous bird in India, whose habit of going about in small flocks is indicated by its native name of "sat-bhai" and the English ones of "Seven Brothers" and "Seven Sisters." This bird, as it frequents trees and bushes, though often feeding on the ground in the open at a short distance from these, must constantly encounter butterflies in repose; that it often succeeds in capturing them on the wing I very much doubt, its weak clumsy flight being certainly most ill-adapted for such a performance. Though it can swallow whole butterflies of considerable size, it often transfers its prey to one foot, and thus holding it, easily picks off the wings. In confinement this species speedily becomes tame enough to feed from the hand, and will eat table scraps, boiled rice, &c., quite readily. So tame were some birds which I kept, that, when after being kept about a fortnight (some of them longer) they were released, they stayed about the compound for about three days, still willing to take insects from my hands. Thus I had an opportunity of checking the results of the experiments I had made on them during their incarceration—a piece of good fortune which has not so far, I believe, fallen to the lot of any previous experimenter.

As I intend to make this paper the first of a series, in which I shall record the results obtained by experiments with several more species of birds and with insectivorous animals of other groups, I refrain at present from drawing any general conclusions; such as can be drawn from the experiments given below will be perfectly obvious to any one who has studied this subject.

I have much pleasure, however, in here expressing my sincere thanks to Dr. Alcock, Superintendent of the Indian Museum, for the kind interest he has taken in my experiments. To him I owe the accommodation of a small aviary for some of my birds, and permission to use the services of the Museum collectors for obtaining insects—requisites indispensable for successful experiments.

I have also to record my obligations to Mr. L. de Nicéville, and to Mr. Barlow of the Museum staff, for assistance in naming the insects herein and after dealt with.

EXPERIMENTS WITH BABBLERS IN CONFINEMENT. SERIES A.

November 11*th.*—Offered various insects to four Babblers (*Crateropus canorus*) which I had just bought and placed in a large hutch, after I had given them some boiled rice, which they ate readily. They seized cockroaches (*Periplaneta americana*) and *Catopsilia* readily, squabbling over them, and one ate a *Terias* whole. They tackled two *Danais chrysippus* just as readily, and I thought I saw one swallowed; certainly there seemed no difference in their behaviour.

Later on in the day, giving the birds two more Danaids, they certainly seized and mauled them, but left them for a little while at any rate; and I found pieces of body and wing from the previous specimens. But these disappeared later. A *Delias eucharis* was torn to pieces, and some of the body at least eaten before my eyes.

November 12*th.*—The Babblers had still some rice left this morning; I took it away and gave them butterflies. I saw *Danais chrysippus* and *Delias eucharis* mauled and left, while of a specimen of a protectively-coloured species part at least was eaten. *Terias* to-day was pecked and left, and even the common Hesperid and a *Catopsilia* pecked about much; and though I believe they were eaten in part, I could not be quite sure.

November 13*th.*—This morning the Babblers had no food and were hungry when I came to them. They took and mauled three *Danais chrysippus*, but I saw none eaten; even one with the wings removed was left. One of them battered and partly at least ate a skipper. A larger skipper (*Tagiades*) was seized, mauled, and apparently eaten, A *Catopsilia* had its wings picked and knocked off and was eaten. A

Delias eucharis (minus abdomen) was mauled and left. A female *Hypolimnas misippus* was taken, and part at least was eaten. The birds take all butterflies one gives them and batter them a bit. Some of the *Danaids* may have eventually been eaten.

Next day I released these Babblers, not having got any very conclusive results from them. They did not seem very keen on butterflies, and were perhaps not healthy. Moreover it was difficult to observe them in a hutch.

EXPERIMENTS WITH BABBLERS IN CONFINEMENT. SERIES B.

December 11*th.*—A fresh Babbler confined alone pulled about an *Euproctis* moth for a time, but I found it left afterwards. I gave him separately an abdomen which he had knocked off, but did not see it eaten.

December 12*th.*—Babbler appeared to eat a bit of an *Euproctis* abdomen.

December 13*th.*—This Babbler, with another, and other birds being now in a small aviary, with ½ inch-mesh netting, I saw one of them seize an *Euproctis.* A Babbler also pulled another of these insects to pieces, but did not eat it as far as I saw.

December 14*th.*—A Babbler ate a *Papilio demoleus** whole, but did not eat a *Danais chrysippus* and *Delias eucharis,* though descending from his perch to eat a *Catopsilia.*

December 15*th.*—The birds in the aviary being hungry, I put in some butterflies. I saw a Babbler eat a *Terias.* Later on, after the birds had had some food (meal moistened with water) I put in more butterflies, and saw a Babbler eat a *Danais genutia, D. chrysippus,* and *Delias eucharis.* Two *Euproctis* were eaten by Babblers. Two *Danais genutia* were seized and torn to pieces, and part of one was apparently eaten by the Babblers, which showed some signs of apparent dislike; of two *D. chrysippus* then given, one was torn up and eaten, and the other torn up and rejected, by a Babbler, which then took and left a *D. genutia* and *Delias eucharis,* and then went and ate some rice. After this I released the other birds in the aviary, as they had no chance with the Babblers. About this time I added a third specimen of the latter.

December 16*th.*—One of the Babblers took and ate nearly whole, after much rubbing and pecking, a caterpillar rather larger and much hairier than that of the Buff-tip (*Pygaera bucephala*). I think this is the larva of whose hairs I recently got my fingers full. The bird had

* *erithonius* auctorum.

food by it, and had had cockroaches in the morning. Another caterpillar, smaller, and covered with long whitish hair, with two pencils of hair near the head, was untouched.

December 17th.—A Babbler ate an *Euproctis* readily. The hairy caterpillar not eaten yesterday was still untouched, so I took it away.

December 18th.—The Babblers ate four specimens of *Euproctis*; they were hungry. They ate some *Catopsilia* and other non-warningly-coloured butterflies with relish, and ate also three *Danais genutia;* but only one of these was eaten directly by one and the same bird, and the others were evidently not relished much, for the birds ate *Papilios** of equal size much more readily. Specimens of a black beetle with yellow patches (*Mylabris sp.*) were taken, and the elytra got rid of, but the birds did not seem to like the body, and I saw one left.

December 19th.—The birds were hungry in the morning, and one ate a *Danais chrysippus* readily enough. Then a *D. limniace* was readily eaten. An *Euploea* was also eaten; the bird pecked it about on the ground much first, seeming especially to attack the yellow anal organ. A cockroach subsequently put in excited more competition than these butterflies, and caused a fight. Several *D. genutia* and *chrysippus* were then turned into the aviary, and two of the Babblers immediately attacked them. I gave them some *Euproctis*, and they ate some, I believe all, of them. By this time, too, they had torn all the *Danais* to pieces, and as I saw no bodies lying about, I presume eaten them, though they had now some plantain (a food they did not relish). In the evening an *Euploea* was eaten, though there was food in the cage.

Yesterday, I think, I put the hairy caterpillar which had previously escaped destruction, in again. It remained untouched for a day, and next morning I found it dead in the water. The birds seemed never even to look at it.

December 21st.—Two of the Babblers had been placed in the cage of a Bhimraj (*Dissemurus paradiseus*), and this bird put in the aviary with a Laughing Jackass (*Dacelo gigas,*) (not used in these experiments) and one Babbler. Another of the hairy caterpillars noted previously (*Dec. 16th*) as eaten by a Babbler remained untouched for some time, but afterwards I found it dead and deprived of its hair, but uneaten. I don't know which bird did this. I put a mixed lot of butterflies in the aviary, and saw the Babbler, which was hungry, three times take and eat a non-warningly-coloured butterfly in preference to *Danais chrysippus* and *D. genutia*, which it could easily have caught. Indeed, I saw it take and drop a *D. genutia*, and seize and eat a *Papilio** instead. It ate a grasshopper before any butterflies. At the end of the day two *Papilios* (one torn) and most if not all of the warningly-coloured species were left, though the Babbler readily ate grasshoppers. Yet, when I gave an *Euploea* to the other two Babblers in the cage, one took and ate it whole, though they had had some grasshoppers, and did not eat some *Danais chrysippus* and *genutia* which I put in, so far as I saw.

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* Not *P. aristolochiæ.*

Between this last date and January 3rd, I took, with one exception, no notes on the behaviour of the Babblers. I added during this time other specimens and had as many as twelve at once. However, I turned out three of these, and started the next series of experiments with nine birds, including the three used in the above series of experiments. I have a note for December 28th, on which date I gave the Babblers a small black and yellow zygaenid moth, which none touched, though some evidently saw it. The other birds had been removed.

Before beginning to take the systematic notes which follow, I had more than once given the birds butterflies, and had seen *Danais*, &c., devoured. I cannot give the exact dates of the experiments following, but they took place on and after January 3rd of 1895, on consecutive days for the most part. I have endeavoured to record each day's experiments separately. One and possibly two, of the present birds were young, but my notes are not quite clear on this point.

EXPERIMENTS WITH BABBLERS IN CONFINEMENT. SERIES C.

I. Put in, in the evening, first some grasshoppers, which were immediately devoured, then some butterflies (*Danais chrysippus*, *genutia* and *limniace*, *Euploea*, *Papilio aristolochiae* and some non-warningly coloured kinds). The *Danainae* were most numerous, and all were attacked, but the non-warningly-coloured species disappeared first. However, all the others but one *Danais genutia* and the *Papilio aristolochiae* were killed and more or less mauled, and some eaten. I saw one bird take and reject an *Euploea*, and another eat one. The *Papilio aristolochiae* was refused four times at least, and sometimes looked at and not touched. I then took it out. A very worn female specimen of *Elymnias undularis* was one of the first insects seized by the Babblers, as also were the *D. limniace*. There was food in the cage at the time.

II. The butterflies offered and partly left yesterday had disappeared this morning, with the exception of a few bits of wing, though there was still some food. In the evening I put some butterflies (one each of *Danais chrysippus*, *genutia*, and *limniace* and some other kinds), into an insect cage, and placing this in the aviary watched the result. One bird went in and took out a *Catopsilia*, which seems to be a favourite. Another (young) went in and took a female *Elymnias undularis*, though he could see its mimetic upperside; but he lost it. The three *Danais* were the last left. Even two of these were ultimately taken, and I suppose eaten; I did not watch the whole process. The other, a *D. chrysippus*, was at the top of the cage, and possibly hard to get; I took it out. The young Babbler took, instead of a *Danais genutia*, a specimen of *Nichitonia xiphia*, which he seemed not to like. However, later on I could only find a few bits of wing left of all the butterflies I had put in, so I suppose it was eaten after all. The birds had had some grasshoppers first.

III. Put a *Danais genutia* into the aviary, where a Babbler took it and ate it whole. A *D. chrysippus* was taken by a Babbler, which was pulling off the wings with no great eagerness, when another took it away and ate the body. An *Euploea* (rather crushed) was eaten readily enough, with part of the wings, by a Babbler. I then put in several *D. chrysippus* and *genutia*, and the birds ate them all and fought over them. I saw one throw up a body two or three times before swallowing it. A *D. chrysippus* was first taken when I put in two of each kind (*D chrysippus* and *D. genutia*) dead. The birds had had some grasshoppers some hours before. Some time afterwards I killed and put in—

(*a.*) One each of *Danais chrysippus*, *genutia*, and *limniace*, *Euploea*, and *Catopsilia*. A bird snatched the *D. limniace* before I took my hand away, and the *Catopsilia* was not, I think, the next taken. The *Euploea* was swallowed whole.

(*b.*) Two *D. chrysippus* and a large brown species put in; a bird first took the latter.

(*c.*) The same two *D. chrysippus* were put in together with a *Junonia*. Two birds advanced at once and one took the *Junonia*, the other a *D. chrysippus*. The *Junonia* was eaten before my eyes, and I saw the other begun upon.

(*d.*) I repeated this experiment with two *D. chrysippus* and another protectively-coloured specimen. This latter was taken by the first bird which came. About this time I saw a bird eat the body of a *Danais*, and soon found two lying about. The birds pecked but did not seem to care for them.

(*e.*) I put in a *Catopsilia* and two *D. chrysippus*; two or three of the birds came at once. One took the *Catopsilia* and another a *D. chrysippus*.

(*f.*) Put in a *Catopsilia* and one *D. chrysippus*. The first comer took the former, and immediately afterwards the latter was taken. The *Catopsilia* was eaten at once with some of its wings. The body of the other was eaten after some rubbing; I do not know whether the eater was the individual which took it.

(*g.*) Put in another *D. chrysippus* and a small fritillary, *Atella phalanta.* A bird took and ate the latter; the former was unregarded for a little time at least, then a bird took and ate at least some of it.

(*h.*) A Babbler took and pulled about a *Delias eucharis,* but then left it. I offered it again, and it was refused by a bird or two, though another appeared to eat part of it.

I then put in one *Danais genutia,* two *D. limniace,* and several *D. chrysippus,* which were immediately attacked as they fluttered about. All of these last mentioned were soon killed and torn to pieces, and I saw at least three eaten, though the birds had rice, &c., in the aviary.

IV. The birds had had no insects but a fly or two when I gave them (dead).

(*a.*) Two *Danais chrysippus* and one *Papilio demoleus.* The latter was taken first. I took the former away and

(*b.*) Presented them again with another *P. demoleus.* Two birds, one young, went for the *Papilio;* the older got it, and then the other bird took a *D. chrysippus.*

(*c.*) Put in two more *D. chrysippus* and a *P. demoleus.* A bird advanced and deliberately chose the latter.

(*d.*) Two more *D. chrysippus* and a *P. demoleus* were put in. The latter was taken first.

(*e.*) Same experiment repeated with same result.

(*f.*) One *D. chrysippus* and one *P. demoleus* put in; first comer chose the latter.

The birds did not seem to me very eager for the *Papilios,* though they so obviously preferred them. All the butterflies were eaten, or at least torn to pieces, and I saw no bodies lying about. There was rice in the food-bowl notwithstanding.

V. Offered the Babblers a *Papilio aristolochiae;* a bird took it and tore off the greater part of the wings, but left the body. Another took this and tore off the thorax, and left the abdomen. A *Danais limniace* was then eaten, at least most of the body, I think by one of the individuals which had refused the other.

(*a.*) Put in the aviary two *Danais chrysippus* and a *Papilio demoleus.* One of the former was first taken, then the *Papilio.*

(*b.*) The experiment was then tried with two *D. chrysippus* and a *Papilio polites.** A *D. chrysippus* was first taken, then *P. polites* by a young bird.

(*c.*) Two *D. chrysippus* and a male *Elymnias undularis* were then put in. *E. undularis* was taken first and swallowed whole. These sets of butterflies were put in dead.

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* *P. pammon* auctorum.

The Babblers then took and left two *Papilio aristolochiae,* though by this time all the Danaids and the *Papilio polites* were more or less torn up and eaten, the latter all but the wings, I think. One of the *P. aristolochiae* was not even killed at first. There was other food in the cage.

(*d.*) Offered the birds a *Danais chrysippus* and a *Catopsilia.* Two of them came at once, so I was not quite certain; but I think the latter was preferred.

(*e.*) Repeated the experiment with two *D. chrysippus* and one *Catopsilia.* The latter was distinctly chosen by the first comer.

(*f.*) Repeated the experiment with two *D. chrysippus* and a *Junonia.* The first comer (young bird) took a *D. chrysippus,* the second the non-warningly-coloured species.

(*g.*) Put in a *Junonia* and one *D. chrysippus.* One bird took one and another the other.

A Babbler took a *Papilio polites* readily. I saw no traces of the *P. aristolochiae* about by this time.

(*h.*) Offered the Babblers a *Papilio polites* and two *Danais chrysippus.* The two first comers took the latter; but the former was soon taken.

(*i.*) A *Papilo demoleus* and a *Danais chrysippus* offered. One bird came, and chose the former; but the *Danais* was soon taken.

(*j.*) One *Catopsilia* and one *D. chrysippus* were offered. The former was chosen by the first comer.

There was some rice still left in the vessel at this time.

VI. (*a.*) Offered to birds, in my hand, one specimen each of *Danais chrysippus, Papilio demoleus,* and *P. polites.* The last named was taken first, and then the *Danais.*

(*b.*) A protectively-coloured butterfly was offered in my hand to the birds, together with a *D. chrysippus.* The *Danais* was taken first.

(*c.*) A *Danais limniace* and a *Papilio demoleus* were offered; the latter was taken first.

(*d.*) A protectively-coloured butterfly (same species as above); again offered with a *D. chrysippus.* The *Danais* was taken first; it was nearest to the bird.

(*e.*) Same experiment repeated with another *D. chrysippus;* the *Danais* again taken first.

(*f.*) Same experiment repeated; this *Danais* was also taken first, though the other species was eaten readily by the next bird.

(*g.*) A small satyrid butterfly offered with *Danais limniace* in my hand. The former was taken first.

(*h.*) *D. limniace* and *Huphina phryne* offered. Former taken first, but latter eaten readily.

(*i.*) Same experiment repeated. This time *Huphina* was taken first.

(*j.*) Living specimens of *Danais chrysippus*, *D. genutia*, and *D. limniace*, *Euploea*, and *Delias eucharis*, together with two dead specimens of the last, put in. Many of these were attacked at once. The birds had no food by them this time.

VII. (*a.*) Offered to the birds *Papilio demoleus* and *Danais limniace*, one of each. Former taken first.

(*b.*) Same experiment repeated with same result.

(*c.*) Experiment again repeated; same result.

(*d.*) Same species of *Papilio* offered with a female *Nepheronia hippia;* the *Papilio* was taken first. The upperside was of course exposed and the insects killed, as usual in these comparative experiments of mine.

The birds had food by them. They ate to-day one specimen of *Nichitonia xiphia.*

(*e.*) An *Euploea* and a *Papilio demoleus* offered; the former was taken first, but the latter swallowed nearly whole.

(*f.*) Experiment repeated; *Papilio demoleus* taken first.

(*g.*) Experiment again repeated; same result.

The Papilios were eaten more readily, usually whole, and apparently more relished.

(*h.*) Experiment again repeated; *P. demoleus* taken first, but the bird which took it did not seem very eager, and did not mind another robbing it of its prey. But it had had others.

(*i.*) Experiment repeated; *Euploea* taken first.

(*j.*) Protectively-coloured species offered with a *Danais limniace;* former chosen and eagerly eaten.

Two or three *Terias* were eaten to-day. A lot of *Danais* (*chrysippus*, *genutia*, *limniace*) and *Euploea*, and a few non-warningly-coloured specimens turned in. All were attacked, but the latter were eaten first, and with more relish, though some *Danainae* were swallowed whole.

VIII. (*a.*) Offered the birds one each of *Papilio demoleus* and *Danais chrysippus.* Both were taken almost simultaneously; the latter first if anything.

(*b.*) Offered, in my hand, one each of a *Catopsilia* and *D. chrysippus.* Former chosen.

(*c.*) Offered one each of a *Catopsilia* and *D. genutia.* The former was chosen, though another bird made a dash at the *Danais.*

(*d.*) Same experiment repeated; *Catopsilia* again chosen.

(*e.*) Small brown Satyrid butterfly offered with *D. genutia;* former was deliberately chosen.

Some specimens of *Euploea, Danais chrysippus*, and *D. genutia*, were given alive, and immediately attacked by some of the birds.

Two *Papilio aristolochiae* were tried and left, while some of the *Danainae* above-mentioned were being torn and eaten, though some were still alive or uneaten. The birds had food by them at the time. Later on offered them—

(*a.*) A *Danais genutia* and a brown Satyrid species. The first comer having a fair field, first took the former, and then dropped it and took the other.

(*b.*) Last experiment repeated; two birds came at once, and the *Danais* was first taken.

(*c.*) Offered a *Junonia* and a *D. genutia ;* the former was taken first.

(*d.*) Put in one *Catopsilia*, one *Danais chrysippus*, and two *Papilio polites* (one mimetic of *P. aristolochiae*, and the other not). The first comer deliberately chose the *Catopsilia ;* the next looked at the remaining three and turned away; then a *P. polites* was taken, and I saw it swallowed nearly whole—I could not say whether by the same individual. The birds had food by them. None of the butterflies previously put in were to be seen. They did not seem very eager even for *Catopsilia*.

IX. Offered to the Babblers killed or disabled specimens as follows:—

(*a.*) One *Danais chrysippus*, one *Catopsilia*. Former taken first.

(*b.*) One *D. chrysippus*, one *Catopsilia*. Latter taken first, by young bird.

(*c.*) Same experiment repeated; *Catopsilia* taken first.

(*d.*) Same experiment repeated with same result.

(*e.*) One *Danais genutia* offered with one *Catopsilia*. Latter deliberately taken first.

(*f.*) One female of *Elymnias undularis*, one *Catopsilia*. Latter taken first. The mimic also taken and swallowed whole.

(*g.*) *Papilio demoleus* and *Danais limniace*. Former taken first.

(*h.*) Same species of *Papilio* and an *Euploea*. *Papilio* taken first.

(*i.*) *D. chrysippus* and *Papilio polites*. Both of these were taken at once.

(*j.*) Same experiment repeated. The first comer took neither, the second *Papilio polites*.

(*k.*) Protectively-coloured Satyrid and *D. chrysippus*. Former taken first, and swallowed whole.

(*l.*) Same experiment repeated. Protective species taken first, and eaten, by the same bird.

This bird again ate one of this Satyrid; though there were *Danais limniace* and *chrysippus* uneaten in the cage. A *Catopsilia* was then put in, and the same bird took and began upon it, when it was taken and soon swallowed by another.

Some *Danais genutia* and *limniace*, *Euploea*, and *Delias eucharis* were then thrown in, but though one or two birds pulled them about, I saw none eaten. The birds were now going to roost. They had had no insect food before on this day, but a number of cockroaches the day before.

X. Offered the birds—

(*a.*) One *Danais chrysippus*, one *Catopsilia.* Latter chosen.

(*b.*) One *D. genutia* one *Catopsilia.* Former chosen, by young bird.

(*c.*) Same experiment repeated. This time the butterflies were on my hand, held on the floor; a bird swooped from the perch on the *Catopsilia*, and took it.

(*d.*) Same two species offered. Both were taken at once.

(*e.*) One protectively-coloured specimen, one *D. chrysippus.* Former deliberately taken.

(*f.*) One *Huphina phryne*, one *D. chrysippus.* Former taken first.

(*g.*) One *Papilio demoleus*, one *D. chrysippus.* Former chosen, but birds not eager.

(*h.*) Same experiment repeated. As the first comer was hesitating, and seeming to prefer the *D. chrysippus*, another snatched the *P. demoleus*

(*i.*) One small protective Satyrid, one *D. chrysippus* offered. The first comer in the last experiment deliberately chose the former, though the *Danais* was nearer.

(*j.*) *Papilio demoleus* offered with *Euploea.* Latter taken first.

Put in three *Euploeas*, one *Danais genutia*, one *D. limniace.* Last chosen deliberately by young bird. I threw in two more *Euploeas* and two *D. limniace.* The former were this time seized, but one bird soon left its prey, and I did not see the other specimen eaten, though I saw one *Euploea* swallowed whole.

In the afternoon of the following day I released these birds, which, as observed in the beginning of this paper, still continued about the place. Thus I was enabled to make the following experiments with them.

Experiments with Babblers at liberty.

January 16th.—As the birds were hopping about the garden eating termites, &c., I gave them a number of butterflies, mostly dead or disabled, comprising specimens of *Danais chrysippus*, *D. genutia*, *D. limniace*, and *Euploea*, with *Papilio demoleus*, *Huphina phryne*, *Catopsilia*, *Junonia*, &c. There was no doubt that these latter non-warningly-coloured species were preferred to *Danais* and *Euploea.* All as far as I saw were eaten, while though the *Danainae* were picked at, and I think one or two of them eaten, I often saw them looked at and then passed over in favour of a *Catopsilia* or other palatable species.

I offered two specimens of the female of *Nepheronia hippia.* The first one, which was displayed, was passed over by a bird in favour of a *Catopsilia*, though the same individual then tried and ate it. The second specimen, whose wings were half closed, did not seem to be noticed at first, but on being thrown to a bird it was picked up and eaten. I saw one bird, eating a *Catopsilia*, leave it and try a *Danais genutia*, and then return to its former prey. I saw one bird try unsuccessfully to catch an uninjured butterfly on the wing; decapitated specimens were caught with some trouble as they fluttered.

This day they four times refused a red, black and white bug (*Dysdercus* sp ?). I thought *Euploeas* were least disliked of the unpalatable butterflies given.

January 17*th.*—This morning I found lying about wings of the butterflies rejected overnight; but these birds may not have eaten the bodies.

I put out several *Danais genutia*, which were not regarded with favour, though one or two were taken. A bird which had left one took and ate a skipper.

Another protective butterfly was eaten in preference to *Danais genutia* and *D. chrysippus.* A *Junonia* was eaten readily.

A male *Elymnias undularis* was eaten readily.

Two *D. genutia* were rejected, but a protectively-coloured species taken.

Some specimens of *Huphina phryne* were taken readily and eaten.

Two birds tried to catch a *D. genutia* on the wing.

A bird took a *Junonia* from my fingers and apparently ate it.

Another protectively-coloured species then taken.

Another attempt made to catch a flying *D. genutia.*

Two male specimens of *Elymnias undularis* taken in succession from my hand.

D. genutia was taken from my hand, but it escaped, and three birds tried to catch it.

Another protective species was taken.

A specimen of a protective species was taken, squabbled for, and eaten.

A protective species was again eaten; then a male *Elymnias undularis*, swallowed whole.

A *D. genutia* was allowed to remain perched on a shrub.

I did not see one *Danais* at this time eaten, though one *D. genutia* was torn up; but I found the body left. Afterwards, however, I saw one *Danais* (I do not know which species) eaten, and then a *D. genutia*; this latter was thrown up several times. Another was eaten; and then I had to leave the birds.

January 18th.—The birds were still about, though one seemed to be missing. I saw some *D. chrysippus* lying about, left from yesterday. In the morning I offered the Babblers a large brown moth and a cockroach, which were taken. The birds, however, did not seem to wish for some rice, &c., which I threw out, though such had formed their ordinary food in confinement, and they had eaten some the day before.

In the late afternoon I offered them some butterflies, mostly decapitated, chiefly *Danais genutia*, but also *D. chrysippus*, *D. limniace*, *Euploea*, and *Delias eucharis*. None of these were eaten, as far as I saw, as long as other species could be had, and only one, a *D. genutia*, afterwards. On the other hand, male *Elymnias undularis*, *Catopsilia*, and other non-warningly-coloured specimens were readily devoured, and even taken from my hand, while specimens of *D. genutia* fluttered about. A male *Nepheronia hippia* was taken and eaten. These experiments left not the slightest doubt in my mind as to the unpalatability of *Danais* and the other "warningly-coloured" forms. Birds would often only look at them, and soon left them when picked up.

Next day the birds had disappeared, and so ended my experiments with this species.

A list of the Butterflies of Sumatra with especial reference to the Species occurring in the north-east of the Island.—By Lionel de Nicéville, F.E.S., C.M.Z.S., &c., *and* Hofrath Dr. L. Martin.

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The island of Sumatra, with Java, Borneo and Celebes, forms one of the Great Sunda group of islands. Rather more than half as large as Borneo and more than twice as large as Java, it is nearly as large as France. Some 1,070 miles in length, with an average breadth of over 120 miles, it has a total area of about 128,000 square miles, or 8,000 more square miles than are contained in the United Kingdom. Oblong in shape, with its longer diameter running north-west to south-east, the island lies between 95° and 106° Long. E., and is almost exactly bisected by the equator, six degrees north and south of which it extends. On the west it is washed by the great Indian Ocean with no adjacent land except a parallel chain of small islands of which Nias is the largest; to the east is the shallow Strait of Malacca, with the Malay Peninsula and the large island of Banka and a few other smaller ones at no great distance. To the south lies the large island of Java, separated only by the narrow Sunda Strait; to the north the Nicobar and Andaman chain of islands seem to form a natural continuation of the enormous volcanic range of mountains that beginning in the Banda Sea, extends through the islands of Wetter, Flores, Sumbawa, Lombok, Bali, Java and Sumatra, and ends in the Andaman Sea. Throughout the whole length of Sumatra extends a mountain-system of several parallel ranges, with large central plateaus or highlands. In this system, called "The Barisans," the highest mountains are mostly volcanoes, which reach an altitude of about 15,000 feet in Mount Kassoumba. Other lofty peaks are Indrapura, 12,255; Lusi, 11,000; Dempo, 10,562; Abong-Abong, 10,000; Ophir, 9,940; Merapi, 9,640; Talang, 8,470; and Salamanga, 6,825 feet. Two of these volcanic cones, Merapi and Talang, are said to be still active. On the west coast the mountains rise abruptly from the Indian Ocean, and in consequence there is no alluvial soil on that side of the island; whilst on the east coast there are large alluvial plains, abounding in water, and intersected by large rivers. This plain is increasing every year, being gradually built up by a broad belt of mangrove-swamp. In the northern half of Sumatra in the above-mentioned alluvial belt, between 3°-4° N. Lat. and 98°-100° E. Lon., are situated the three small Malayan sultanates of Langkat, Deli, and Serdang (with the butterfly fauna of which this paper deals), that are world-renowned for the splendid tobacco grown there, which is almost entirely used for making the outer covers of cigars. The southern and western borders of these sultanates are formed by the Barisans, here named the Battak mountains from the inhabitants of these ranges being several tribes of anthropophagous Battaks, the aborigines of Sumatra. The different ranges of the Battak mountains here include the extensive Toba highlands, which surround the large and for long mysterious Lake Toba that lies in their centre. North of this lake is the Karo plateau, inhabited by the Karo-Battak tribe, and forming the true "hinter-land" of the above-named sultanates. The northern boundary of this region—as we deal chiefly with this part of the island, we will call it "our area"—is the mountainous land of the Gayoe and Allas tribes, who are Mahomedans; to the east lies the large sultanate of Siak. The altitude of the Karo plateau may be estimated at about 4,000 feet; the highest peaks of the Battak mountains are Simanabum, nearly 8,000 feet in height, and Sebayak, which is a little over 7,000 feet.

Owing to its situation, protected on the south and west by the Barisans, and with the narrow and quiet Strait of Malacca, beyond which again is the Malay Peninsula also with a high central range to the north and east, there is no monsoon in our area, and consequently neither a true rainy, nor a true dry season; though during the south-west monsoon there is a little more rain than usual, say about 18 days in the month, while during the north-east monsoon there are only 11 rainy days in the month. Nevertheless there is a yearly average rainfall of about 90 inches (2,200 mm.); this, together with a mean daily temperature of 80°, and an extreme daily range of 12·6° Fahrenheit, makes a very damp and unhealthy climate, but fits it for a high development of insect life. The plains of the three sultanates, the outer ranges of the Battak mountains, and the Battak mountains themselves, which include the Karo Central Plateau, are the localities where all the species of *Rhopalocera* contained in our collections and enumerated in the following list, have been captured, except a few from the Gayoe lands and from Indragiri, another Malayan sultanate south of Siak, and nearly opposite to Singapore.

The plains were formerly entirely covered with large, dense, lofty primeval forest, but this has had to make way for the miserable tobacco plant, of which the cultivation began about the year 1865. The primeval forest once destroyed by fire and the axe does not grow again, but is replaced by a high-growing and tenacious species of grass, called "Lalang" in Malay (*Imperata arundinacea*, Cyrill.), which now entirely covers all the ground temporarily unoccupied by tobacco. The cultivation of the nicotinous plant pays so highly and yearly so increases in extent, that there is now no forest whatever left in the true tobacco districts of Deli—Deli being the name generally used as a topographical unity for all the three tobacco-yielding sultanates—and in consequence, as *Imperata arundinacea* is not liked by any animal, there have disappeared not only all the interesting pachyderms, but also all the butterflies whose food-plants are in the forests. Ten or twelve years ago, or even six or eight, certain species, for instance the different black and brown *Euplœas*, were to be found commonly everywhere. But then all the forest had not been cut down; now these species are never seen, having retired to the well-wooded outer hills and mountains, or to the boundaries of the tobacco districts north of Langkat, and to the south in Serdang. Only the most common species which feed on the *Gramineæ*, garden vegetables, cocoa-nut palms and other fruit-trees and on ubiquitous plants remain. So it has become necessary to send our collectors far away out of range of tobacco cultivation.

Regarding the elevations of the different places where our captures were made, we could generally distinguish four well-separated zones :—

1. The zone of the plains from the sea-board to the elevation of Namoe Oekor (266 feet), with the subzone of the beach, situated quite close to the mangrove fence of the coast. Laboean and the Saentis Estate are localities in this subzone, whereas Mabar (25 feet), Paya Bakong (40 feet), Stabat (45 feet), Medan, the capital of the Deli district (50 feet), Selesseh (90 feet), and Dr. Martin's later station at Bindjei (100 feet), all belong to this first zone.

2. The zone of the outer hills, beginning some few miles south of Namoe Oekor and extending to Bekantschan, the elevation of this district being between 300 and 2,400 feet. Kampong (village) Singhapura (725 feet), Namoe Tampis and Namoe Blanka (1,050 feet), are good localities in this zone, to which may also be added the villages of Bohorok and Kepras, situated more to the west in the direction of the Gayoe country.

3. The zone of the higher mountains which begins south of Bekantschan, and ends on the margin of the Central Plateau, with the frequently-visited valley of the Soengei Batoe (4,125 feet). Between Bekantschan and Soengei Batoe there is the Bekantschan pass, leading to the Central Plateau, at an elevation of 4,785 feet.

4. The Central Plateau itself, with no elevation less than 4,000 feet. The Kampongs of Naman, Beras Tepoe, Soekanaloe, and Atjih Djahé more to the south in the direction of lake Toba, were the spots where our collectors were most successful.

Two other good collecting places have to be mentioned. The first is Paya Bakong which is situated quite in the centre of tobacco-land.

Owing to the fortunate presence of an undrainable swamp on either side of the little Diski river, it still possesses a patch of high forest of several square miles in extent, in which many of the rarer species such as *Charaxes*, *Papilio hermocrates*, Felder, and *P. delessertii*, Guérin, have found an asylum. The second, the often-mentioned Selesseh, lies at a distance of six miles from Bindjei, and is on the border of tobacco cultivation and immediately to the west of the village of Selesseh, where there is splendid continuous primeval forest which yields precious crops of rare butterflies, especially on the banks of the large Wampoe river.

Our collectors were usually Battaks from the two mountainous zones; to Selesseh, however, and other places in the plains we usually sent two very clever Chinamen. The latter were most zealous if given some advance of pay, which allowed them to buy some necessary provisions and the never-to-be-omitted opium. On their return with their bag of captured butterflies they received the balance of their monthly salary, together with an extra bonus for any rarer spoil they may have been fortunate enough to capture. The Battaks received some rice and salt fish, enough to feed them for a fortnight, before leaving for the mountains, but as they are inveterate gamblers, and will not turn out of their villages till they had lost at some game of hazard or another every cent they possess, no advance in cash was given them. When all their money from the fruits of their last expedition was lost, then they asked for a tin box, some butterfly papers and a net, and moved off with their provisions very slowly and reluctantly southwards to the evergreen mountains. Being moreover very lazy, it was impossible to grant them a fixed salary, so they were paid solely by results, and by valuation of the captures they brought in. On their return from the mountains after delivering the insects and receiving their dollars, they immediately set to gambling, and did not appear again on the surface so long as a cent remained. All Battak collectors, even the most intelligent and zealous, lose their interest in the subject after a certain time, and would return with hardly anything, or a few common and useless species, and in consequence had to be discharged—a very great inconvenience, as it always takes a long time to break in a native as a good collector. Of course there was always lost or damaged many a rare and fine specimen through the awkwardness of a new collector. A few Gayoe collectors also were employed, who went farther away to the north and west to the Gayoelands. They brought various species of *Charaxes* largely, *Prioneris clemanthe*, Doubleday, *Ixias ludekingii*, Vollenhoven, *Hebomoia borneënsis*, Wallace, *Papilio perses*, de Nicéville, and *P. payeni*, Boisduval, all of which are very rare or do not occur at all on the Central Plateau. In

1893 and 1894, Mr. de Nicéville induced three amateur collectors in British India to send down to Sumatra some of the well-known Lepcha collectors from Darjiling to Dr. Martin's care. These men met with very good success, though at first they were afraid to mix with the cannibal Battaks and refused to go to the mountains. However, after giving them a Battak guide and interpreter they went off to the hills regularly, and did very well there.

A large proportion of the really rare endemic species of butterflies found in the island occur only in the mountains, from the lower slopes of which and from the high Central Plateau, alone, are obtained the interesting species that are common to the eastern Himalayas and Sumatra, clearly showing the aforetime continuation of the Asiatic continent by way of the Malay Peninsula through Sumatra to Java and Bali, between which latter small island and the equally small island of Lombok occurs the deep depression in the sea floor which forms "Wallace's Line," dividing the Indo-Malayan from the Austro-Malayan region. The most remarkable of these species which are common to the Sikhim Himalayas and the mountains of Sumatra, but which have not as yet been recorded from the intervening Malay Peninsula are —

Enispe euthymius, Doubleday.
Pareba vesta, Fabricius, local race *vestita*, de Nicéville.
Apatura namouna, Doubleday.
Neptis sankara, Kollar.
Argynnis niphe, Linnæus.
Limenitis danava, Moore, local race *albomarginata*, Weymer.
   „ *dudu*, Westwood, local race *bockii*, Moore.
Cyrestis (*Chersonesia*) *risa*, Doubleday and Hewitson, local race *cyanee*, de Nicéville.
Castalius ananda, de Nicéville.
Arrhopala teesta, de Nicéville.
Ilerda epicles, Godart, local race *ila*, de Nicéville.
Rapala schistacea, Moore.
   „ *scintilla*, de Nicéville.
Delias belladonna, Fabricius.
Terias libythea, Fabricius.
Huphina nadina, Lucas.
   „ *nerissa*, Fabricius, local race *sumatrana*, Hagen.
Papilio cloanthus, Westwood, local race *sumatrana*, Hagen.
   „ *payeni*, Boisduval.
Oupitha purreea, Moore.
Halpe zema, Hewitson.

As mentioned above, north-eastern Sumatra does not possess a well-marked dry- and wet-season, such as is found over most of the continent of India, there being no month in the year when it does not rain; indeed it is rare for a week to pass without a shower, consequently there are no dry-season forms of butterflies to be found in Sumatra except the dry-season form of *Melanitis ismene*, Cramer (=*leda*, Linnæus, *auctorum*), which, as also in Java, is found all the year round equally commonly with the wet-season ocellated form, *M. determinata*, Butler.

We would especially bring to notice the occurrence in North-Eastern Sumatra of a very peculiar endemic form of the female of *Papilio memnon*, Linnæus. It belongs to the first form group of females of the species, *i.e.*, the form which has no tail to the hindwing and is most like the male; the second form is also tailless, but has a large white patch on the outer half of the hindwing never found in the first form. This peculiar first form female has the "epaulottes" (*i.e.*, the basal portion of the discoidal cell of the forewing on both surfaces) almost pure white, faintly tinged only with ochreous, so that it may perhaps be called cream-coloured. It probably mimics the second form female of *Papilio forbesi*, Grose Smith, which also possesses similar white epaulettes, the first form lacking them altogether, and is therefore like the male. It may be urged against this theory that females of *P. forbesi* are very rare, especially the white-epauletted second form, Dr. Martin having obtained only two specimens of it. But this scarcity is probably more apparent than real, both sexes of *P. forbesi* occurring in equal numbers, but the males coming down to the hill streams to drink are caught in large numbers, while their less thirsty spouses keep only to the thick forest where they escape the dangers of the butterfly net.

It should be pointed out that de Nicéville is solely responsible for the nomenclature employed in this paper, and for all statements appearing in the first person singular, together with the descriptions of species and sexes; while Martin, who has lived for 13 years in north-east Sumatra, is mainly responsible for the notes on distribution in the island itself, scarcity or rarity, season of occurrence, &c., of the various species; de Nicéville having but twice visited Sumatra, and then only for short periods.

The literature of the subject is of course very scattered and fragmentary. The following is a list of the principal papers dealing with the *Rhopalocera* of Sumatra:—

I. P. C. T. Snellen. Tijd. voor Ent., vol. xx, p. 65 (1877), "*Lepidoptera* op Sumatra verzameld, voornamelijk in Atchin." Enumerates 35 species.

II. Henley Grose Smith. Appendix v of "The Head-Hunters of Borneo" by Carl Bock. English edition, 1881. "List of Sumatra Butterflies." Enumerates 226 species.

III. P. C. T. Snellen, Tijd. voor Ent., vol. xxxiii, p. 215 (1890), "Lijst van *Lepidoptera* op Sumatra." Enumerates 48 species.

IV. Dr. B. Hagen. "Die Pflanzen- und Thierwelt von Deli auf der Ostküste Sumatra's." Separat-Abdruck aus "Tijdschrift van het Koninklijk Nederlandsch Aardrijkskundig Genootschap." Jaargang 1890. Leiden.—E. J. Brill. Enumerates 323 species.

V. P. C. T. Snellen. "Midden-Sumatra." Lepidoptera (1892). Enumerates 104 species.

VI. Dr. B. Hagen. Iris, vol. vii, p. 1 (1894). "Verzeichniss der von mir auf Sumatra gafangenen *Rhopaloceren*." Enumerates 109 species in the subfamilies *Papilioninæ*, *Pierinæ* and *Danainæ* only.

VII. Hofrath Dr. L. Martin. "Einige neue Tagschmetterlinge von Nordost-Sumatra." Munich, 1895. Pts. I and II. Enumerates 9 species.

Besides these papers exclusively on Sumatra butterflies search has been made for all references to the butterflies of the island in Mr. W. F. Kirby's "A Synonymic Catalogue of Diurnal Lepidoptera" up to 1877, and "The Record of the Zoological Literature" up to 1893, the date of the last volume published; Dr. A. R. Wallace's papers on Eastern Butterflies; Mr. A. G. Butler's paper on the Butterflies of Malacca; Dr. O. Staudinger's "Exotische Schmetterlinge," and the Butterflies of Palawan; Herr Georg Semper's "Schmetterlinge der Philippinischen Inseln;" and Mr. W. L. Distant's "Rhopalocera Malayana." It is hoped that the list is fairly complete as far as present knowledge goes. The remarks on each species are headed by the names of the different writers who have recorded the species from Sumatra. All those species that have not been obtained by ourselves have an asterisk (*) prefixed to the name. Dr. Martin is of opinion that this list cannot be greatly extended, and that it is nearly complete. I do not agree with him; up to the last month of his stay in the island, species new to the list continued to be obtained; besides which, considering the vast extent of the island, that it is largely covered with almost impenetrable virgin forest, that a considerable portion of the country has never been explored, that it contains a continuous chain of high volcanic mountains running throughout its entire length which is almost unknown, and has been crossed from north to south in but few places, and finally that Dr. Martin's collectors visited a few favoured spots only, at most 50 miles apart, I think it almost certain that this list will some day be increased by an additional 100 species at least. At the same time we may we think point with some little pride to the fact that it is far larger than any local list which has ever been published except for certain places in Central and South America, containing as it does some 756 species. Next to it probably in size is de Nicéville's "A List of the Butterflies of Sikhim" in the Gazetteer of Sikhim (1894), in which 631 species are enumerated. Synonomy for the commoner and better known species has not been given; but all references to figures of species from Sumatra and lately described species, as well as synonyms of recent date have as far as known been entered.

The imperfections of this list are doubtless many, but we would ask our adverse critics to remember the disadvantages of working in a tropical climate, and also the many letters that have to be written, the number of books to be consulted, the many collectors to be "caught," trained, supplied with necessaries and depatched to the collecting grounds, and the time occupied in preparing and conserving the specimens when obtained, before a list similar to this one can be presented to, let us hope, an indulgent public.

Family NYMPHALIDÆ.

Subfamily DANAINÆ.

*1. HESTIA LYNCEUS, Drury.

H. reinwardti, Moore, Proc. Zool. Soc. Lond., 1883, p. 218, n. 3.
H. druyri l. c., p. 219, n. 6.

Snellen as *linceus* [sic]. Hagen as *lynceus* and *lyncens* [sic]. Grose Smith. Butler. Staudinger. Distant. Moore as *reinwardti* and *druyri*. A common species, occurring from the lower slopes of the mountains to the sea. As usual it is very variable, two of these varieties have been described by Moore as distinct species occurring in Sumatra. The dark variety figured by Distant in Rhop. Malay., pl. i, fig. 2, only comes from places near the mountains and the outer slopes where the rainfall is far heavier than in the plains, while the lighter specimens are found in the forests of the alluvial plain, but the two forms gradually merge the one into the other, and no distinguishing line can be drawn between them. Specimens of the genus *Hestia* are nearly always seen in pairs, and are very fond of flying over the small streams so common in our forests. They never leave the high forest, probably because they have a very weak flight, and their enormous tissue-paper-like wings cannot withstand the wind away from the shelter of the trees.

2. HESTIA BELIA, Westwood.

Hagen as *linteata*. The Sumatran form of this species appears to be nearer to the Javan *H. belia* than to the whiter *H. linteata*, Butler, from the Malay Peninsula, but at best the latter is but a local race of the former. For many years there existed a single specimen in Dr. Martin's collection without locality label, and he nearly despaired of getting it again, when in May, 1894, he obtained all at once in one spot five specimens from Bandar Quala in Serdang, where no specimen of *H. lynceus*, Drury, is ever found, as Mr. Puttfarcken, a very enthusiastic collector of that place, has noted.

3. IDEOPSIS (*Gamana*) DAOS, Boisduval.

Snellen as *Hestia daos*. Hagen as *I. daos*, Horsfield and Moore [sic]. Butler. Staudinger. Distant. Mr. W. F. Kirby, in "Allen's Naturalist's Library. Lepidoptera," vol. i, p. 15 (1894), suggests that the form of this species occurring in Sumatra may be distinct from the typical Bornean form. I possess specimens from both islands, and find that they agree almost exactly. Dr. Staudinger refers to a darker form of the species occurring in Sumatra and Nias. The former is normal; the latter is the *Gamana costalis* of Moore, and is a distinct species. In Sumatra *I. daos* is found not higher than Bekantschan. It is mimicked by a very beautiful day-flying Moth, probably of the genus *Isbarta*, Walker (? *I. glauca*, Walker, from Sumatra), family *Zygænidæ*. On "The Crag" at Penang, 2,000 feet, *I. daos* is very common.

4. DANAIS (*Radena*) VULGARIS, Butler.

Grose Smith. A common species of the plains, the female much rarer than the male. It occurs all the year round, but if there should be a break in the regular rainfall, as there is sometimes in February and March, then only worn specimens are on the wing, shewing that damp weather is necessary for the disclosure of imagines; otherwise generation follows generation regularly throughout the year.

5. *DANAIS (*Radena*) SIMILIS, Linnæus.

Grose Smith. Snellen. Hagen. Mr. Henley Grose Smith is the only writer who gives both *D. vulgaris*, Butler, and *D. similis* from Sumatra. Mr. Moore restricts *D. similis* to Hongkong and Formosa. I greatly doubt its occurrence in Sumatra.

6. *DANAIS (*Radena*) JUVENTA, Cramer.

Moore. Semper from West Sumatra. As it is found in Singapore (*Moore*), Banka, Java, Labuan, Lombok and Billiton, it is possible that it may also occur in Sumatra in the south and west. Banka and Java are only separated from Sumatra by very narrow straits.

7. DANAIS (*Tirumala*) SEPTENTRIONIS, Butler.

Hagen. Quite common in the plains and lower slopes of the hills.

8. *DANAIS (*Tirumala*) LIMNIACE, Cramer.

Hagen. As this species occurs in Burma and the Nicobar Isles, it is possible that it may also be found in Sumatra. However, as Dr. Hagen records in his first paper *D. limniace* and no *D. septentrionis*, and in his second paper *D. septentrionis* and no *D. limniace*, his first identification was probably incorrect.

I wish to take this opportunity to record the occurrence of a butterfly in Malayana which has been well-named in English "The Wanderer," but about whose specific name there has of late years been much contention and confusion. Formerly it was known as *Danais archippus*, Fabricius (1793), then as *Danais (Anosia) plexippus*, Linnæus (1758); recently, however, Mr. W. F. Kirby in "Allen's Naturalist's Library. Lepidoptera," vol. i, pp. 12 and 19 (1894), has pointed out that the *Papilio plexippus* of Linnæus, and the *Papilio archippus* of Cramer [sic, ? Fabricius] cannot apply to this species, and that it should be known as *Danais (Anosia) menippe*, Hübner, described in 1816. But an older name than this last is *Papilio erippus*, Cramer (1775), which should apparently be applied to it, unless *Danais erippus*, described from Brazil, be considered to be a distinct species from *D. menippe*, which, however, Mr. Scudder is not prepared to admit it to be, in which case *D. erippus* must be applied to "The Wanderer." It is certain, however, that *D. erippus* is not the typical form, being in fact a local race of *D. menippe*, so that our species must, as Kirby says, be known as *D. menippe*, Hübner. In my opinion the most accurate nomenclature for the butterfly would be *Danais (Anosia) erippus menippe*, Hübner. At any rate the species here treated has been well figured by Cramer in "Papillons Exotiques" on plate ccvi, figs. E, F (1779), from a female example as *Papilio plexippus.* Mr. W. F. Kirby has already recorded it from Java, I now, for the first time I believe, record it from North Borneo, the late Mr. W. Davison, who was for some years and till his death the Curator of the Raffles Museum, Singapore, having sent me to see a male specimen from that island. The Rev. W. J. Holland, Ph. D., in the Ann. Report Ent. Soc. Ontario for 1893, notes that he has received single specimens of *Danais plexippus*, Linnæus, from Borneo and Java, also its occurrence in the Azores. In Part ii of a new edition of Morris' "A History of British Butterflies," p. 72 (1895), it is stated (though the authority is not given) to have been found in the Andaman Islands. Furthermore, the late Mr. E. F. T. Atkinson in 1889 presented a female specimen of this species to the Indian Museum, Calcutta, which was captured on the 19th April, 1889, by Mr. C. White, the chief officer on board the Peninsular and Oriental S. S. "Ravenna" in the Straits of Malacca (which is at the point where the butterfly was caught only a few miles broad), not far off the island of Pulo Jara between Penang and Singapore. It is therefore not at all improbable that the butterfly flew off from either the adjacent island of Sumatra or from the Asiatic mainland. I have for some years past been looking forward to its capture in India proper, and I think it cannot be long hence before we have evidence of its having established itself on this continent.

P.S.—Since the above was in type, I have lighted on an article in "The Entomologist's Record and Journal of Variation," vol. v, p. 1 (1894), by Dr. F. J. Buckell, entitled "Danais archippus, Anosia plexippus, or What," in which he discusses the question of the correct name by which "The Wanderer" should be known, and arrives at the following conclusions:—

"1.—The balance of argument is against the claim that the American insect is the *plexippus* of Linnæus.

2.—The earliest name given to that species was *erippus*, Cramer, and, if the 'law of priority' is to be pedantically adhered to, this is the trivial name that must be adopted.

3.—The Fabrician name, *archippus*, is that by which the species has been most widely known, and as changes in accustomed nomenclature are to be deprecated, and as, moreover, *erippus*, Cramer, is a varietal form found in Brazil, *archippus* should be retained as the trival name of the species, and *erippus* used as the name of the variety."

As will be seen above, I am unable to follow Dr. Buckell in his conclusions, priority of nomenclature *must* in all cases be strictly maintained.

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9. DANAIS (*Limnas*) CHRYSIPPUS, Linnæus.

Snellen. Hagen. Moore. Found only in the alluvial plain, all the year round, but always very local, and restricted to spots where its food-plant, species of *Calotropis* and *Asclepias*, are found in abundance. There, under a concatination of favourable circumstances, an immense increase of the species, and thousands of specimens, appear. When an over population of this nature occurs, all the food-plants are entirely eaten up by the caterpillars, food gets scarce, and the few butterflies which reach maturity are very small. It takes a long time to recover, and not a single specimen may be seen for a year.

Aberration *alcippus*, Cramer (=*alcippoides*, Moore). Hagen as var. *alcippoides*. Semper as *alcippus* from a small island near Sumatra

(Tijd. voor Ent., vol. xxiii, pp. xiii and xiv (1880). Alphéraky has figured this aberration in Romanoff's "Mémoires sur les Lépidoptères," vol. v, p. 220, pl. xi, fig. 3, *female* (1889), from Teneriffe. Mr. Moore records this "species" from Singapore; it is almost as common as *D. chrysippus* in the plains of Sumatra. I am unable to consider *D. alcippoides*, Moore, Proc. Zool. Soc. Lond., 1883, p. 238, n. 3, pl. xxxi, fig. 1, *male*, as an aberration even to be distinct from the *D. alcippus* of Cramer. It is true that the oblique subapical series of spots on the forewing, especially on the underside, appears to be somewhat broader in Oriental than in African specimens (I have, however, only Cramer's figure of the African form of *D. alcippus* to guide me), but all the other characters given by Mr. Moore to distinguish between the two forms are so obviously variable even in Sumatran specimens that they can have no specific value. I hold that *D. alcippus* is an occasional aberration or "sport" only of *D. chrysippus*, certainly not a distinct species. Dr. Martin during the first years of his residence in Sumatra from 1882 to 1891, as also Dr. Hagen, never saw *D. alcippus*, the first specimens appearing in 1892 near Selesseh, immigrating into Deli from the north-west. Since that year the true *D. chrysippus* has become rarer and rarer, and the aberrational form has become more and more common.

10. DANAIS (*Salatura*) INTERMEDIA, Moore.

Salatura sumatrana, Moore, Proc. Zool. Soc. Lond., 1883, p. 242, n. 8.

Moore as *sumatrana*. Hagen as *genutia*. Very common in the plains of Sumatra. It is, I think, a very remarkable fact that *D. plexippus*, Linnæus,* which is a common species in the Malay Peninsula, should not be found in Sumatra, but be replaced by *D. intermedia*, which latter in the Malay Peninsula is probably only an aberration or "sport" of *D. plexippus*, but has become fixed as a distinct species in Sumatra. In my collection from the Asiatic mainland I have every gradation between typical *D. plexippus* and *D. intermedia*. I am quite unable to find any character by which to separate *D. sumatrana*, Moore, from *D. intermedia*, Moore.

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* Mr. W. F. Kirby has recently shewn in "Allen's Naturalist's Library. Lepidoptera," vol. i, p. 19, pl. v, fig. 1, *male* (1894), that the butterfly which has for the last fifteen years or so gone under the name of *Danais genutia*, Cramer (1779), must revert to the name by which it was previously almost universally known, *viz.*, *Danais plexippus*, Linnæus (1758), which latter was described as having a white band on the forewing like *D. chrysippus*, Linnæus, a character not found in any American species of *Danais*, *D. plexippus* having been originally erroneously described from America.

11. DANAIS (*Salatura*) HEGESIPPUS, Cramer.

Snellen as *hegesippus* and as *melanippus*, the latter being a distinct local race from Java. Hagen as *melanippus*, var. *hegesippus*. Butler as *melanippus*. Distant as *melanippus*, var. *hegesippus*. It was figured by Cramer from a female specimen from the west coast of Sumatra. *D. intermedia*, Moore, is found in the smaller hills bordering the alluvial plain, and is still to be got at Bekantschan, whereas *D. hegesippus* is always found within a moderate distance of the sea. On the islands of Penang, Singapore and Riau (the latter belonging to the Dutch) *D. hegesippus* occurs commonly, while *D. intermedia* is decidedly rarer, or wanting altogether.

12. DANAIS (*Bahora*) ASPASIA, Fabricius.

Hagen as *crocea*; also as *aspasia*, var. *crocea*. Staudinger. Distant as *aspasia*, var. *crocea*. I am quite unable to separate *D. crocea*, Butler, from *D. aspasia*, *vide* Journ. Bomb. Nat. Hist. Soc., vol. x, p. 13, (1895). I have a large series of these two supposed distinct species from the typical localities for each, and they are absolutely indistinguishable. *D. aspasia* may be found in Sumatra all the year round, but always only singly. In the spots where a blue Heliotrope-like flower is in abundance, the males of this species will occur singly together with numerous species of *Danais* and *Euplœa*, but the females are only found in the forests, and never frequent these well-beloved flowers of their husbands, brothers and cousins.

13. DANAIS (*Parantica*) AGLAIOIDES, Felder.

Hagen as *agleoides* [sic]. Grose Smith as *agleoides* [sic]. Staudinger as *agleoides* [sic]. Distant as *agleoides* [sic]. The males are very common in the plains, the females very rare as in the case of *D. vulgaris*, Butler. On the wing these two species are hardly distinguishable.

14. *DANAIS (*Parantica*) GRAMMICA, Boisduval.

Grose Smith. Dr. Martin has never met with this species. Mr. Moore restricts it to Java, but it may quite possibly occur at the south-east end of Sumatra, which is only separated from Java by the very narrow Sunda Strait. It is known to me by Boisduval's figure only.

15. DANAIS (*Caduga*) TYTIOIDES, de Nicéville.

D. melaneus, Cramer, var. *tityoides* [sic], Hagen, Die Pflanzen- und Thierwelt von Deli auf der ostküste Sumatra's, p. 192, n. 5 (1890).

D. (*Caduga*) *tytioides*, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. viii, p. 37, n. 1, pl. K, figs. 1, *male*; 2, *female* (1893).

Hagen. Occurs somewhat rarely only on the Central Plateau and not below 3,000 feet elevation, not even being found at Bekantschan. As Dr. Hagen wrongly diagnosed this species by making it a "variety" of *D. melaneus*, Cramer, which it certainly is not, seeing that it is a local race of *D. tytia*, Gray; as moreover, he spelt the name incorrectly, I refuse to accept his name for the species, though it is prior to mine. In all cases where a species has been first described incorrectly as a "variety" of another species, and is subsequently proved to be a distinct species, it is optional for the author who so proves it to be distinct to use the varietal name so given to it in a full specific sense, or to rename it altogether.

16. DANAIS (*Caduga*) BANKSII, Moore.

Caduga banksii, Moore, Proc. Zool. Soc. Lond., 1883, p. 251, n. 8.

Moore. Grose Smith as *melaneus*, Cramer. Semper as *aglea*, Cramer. Hagen as *aglea* and *melaneus*. It is a good local race of *D. melaneus*, Cramer, from the eastern Himalayas, Assam, Burma, and the Malay Peninsula. Occurs on the Central Plateau and higher hills as also in the plains, the specimens from the highest points being richer and darker in colour than those from a lower elevation.

17. *EUPLŒA (*Menama*) BUXTONI, Moore.

Menama buxtoni, Moore, Proc. Zool. Soc. Lond., 1883, p. 265, n. 5.

Moore. Originally described from Sumatra. Dr. Martin has not met with any species of this distinct subgenus in Sumatra.

18. *EUPLŒA (*Menama*) MODESTA, Butler.

Grose Smith. Originally described from Siam. It is more than doubtful if two species of the subgenus *Menama* occur in Sumatra. Dr. Hagen records quite funnily "*Menama* species near *loeza*." He does not appear to know that *Menama* is a genus of Mr. Moore's, he treats the name as specific. The species "*loeza*" is probably intended to mean *Menama lorzæ*, Moore, Proc. Zool. Soc. Lond., 1883, p. 265, n. 6, pl. xxxi, fig. 5, *male*, from Sandakan, North Borneo.

19. EUPLŒA (*Tronga*) BREMERI, Felder.

Hagen. Butler. A common species in the plains and occurs also in the lower ranges of the mountains up to 1,500 feet elevation. In December, 1894, and January, 1895, Dr. Martin obtained hundreds of specimens from Kepras, a village on the boundary between Langkat and the independent Battak country. The female is always somewhat scarce. It may be of interest to note that out of large numbers of butterflies of this species there are always to be found a few males which have on the upperside of the forewing a short and sometimes even a quite distinct and longer "male-mark." The genus *Tronga* comes into Mr. Moore's group A of the *Euplœina*, which is defined as having "No 'sexual-mark' or scent-producing organ on forewing." But there are many exceptions to this definition.

20. EUPLŒA (*Tronga*) MOOREI, Butler.

Butler. Kirby. Moore. This species may be distinguished from *E. bremeri*, Felder, by its smaller size, the duller colour of the upperside of both wings, being brown, not black, with all the white spots smaller. It never shews any traces of a "male-mark." It occurs in the plains about equally commonly as *E. bremeri*, though it is found also at somewhat greater elevations in the hills, occurring even on the Central Plateau; these latter specimens show only very few white spots.

21. *EUPLŒA (*Tronga*) HEYLÆRTSII, Moore.

Tronga heylærtsii, Moore, Lep. Ind., vol. i, p. 79 (1890).

Moore. Described from Sumatra, but we have failed to recognise it.

22. EUPLŒA (*Adigama*) MALAYICA, Butler.

Euplœa ochsenheimeri, Lucas, Snellen, Midden-Sumatra, Lepidoptera, p. 12, n. 1, pl. ii, figs. 1, 2, *male* (1892).

Grose Smith as *ochsenheimeieri* [sic]. Moore. Snellen as *ochsenheimeri*, Lucas. Hagen as *ochsenheimeri*, Butler and Lucas. Staudinger. Distant. This beautiful and large species is found only in the deep forests of the plains, never higher than Namoe Oekor. It flies mostly alone high over the small openings in the evergreen forests, and is found all the year round, but never in large numbers. There has been much confusion regarding the name *Euplœa ochsenheimeri*. Two species have been so called, one by Lucas in 1853, and one by Moore in 1857, both from Java. Mr. Moore places his own species in the genus *Adigama*, and Lucas' in *Tiruna*. There has been no *Euplœa* named *ochsenheimeri* by Butler, as stated by Dr. Hagen. To further complicate matters, Snellen figures *E. malayica*, Butler, as *E. ochsenheimeri*, Lucas, with which it has nothing whatever in common.

23. *EUPLŒA (*Andasena*) BELINDA, Butler.

Euplœa belinda, Butler, Journ. Linn. Soc. Lond., Zoology, vol. xiv, p. 299, n. 2 (1878).

Butler. Moore. Originally described from Sumatra. We have seen no *Euplœa* from Sumatra belonging to the subgenus *Andasena*.

24. *EUPLŒA (*Andasena*) OROPE, Boisduval.

Kirby. Butler as a var. with a query, from Sumatra. Originally described from Taïti, recorded from Timor by Butler. Very doubtfully Sumatran.

25. *EUPLŒA (*Betanga*) SCHERZERI, Felder.

Kirby. Originally described from Ceylon. Entirely unknown to us.

26. EUPLŒA (*Penoa*) MENETRIESII, Felder.

Grose Smith. Hagen. Distant. Not very common. Found in the plains and also on the outer hills as high as Bekantschan. The female is much rarer than the male, and often shews a white spot in the discoidal cell of the forewing on the upperside. It has in the male a much smaller "male-mark" than *E. pinwillii*, Butler.

27. EUPLŒA (*Penoa*) PINWILLII, Butler.

Hagen as *pinwilli*, Godardt [sic]. Staudinger. Is very common everywhere at low elevations, and especially frequents the above-mentioned Heliotrope-like flowers. The female is of course much rarer than the male, and possesses a violet gloss to both wings on the upperside, which the female of *E. ménétrièsii*, Felder, never has. It has in the male a much larger "male-mark" than in *E. ménétrièsii.*

28. *EUPLŒA (*Crastia*) CORE, Cramer.

A single female recorded from Sumatra by Snellen, the specimen being probably some species of *Tronga. E. core* is practically confined to the continent of India.

29. EUPLŒA (*Crastia*) DISTANTII, Moore.

Crastia distantii, Moore, Ann. and Mag. of Nat. Hist., fifth series, vol. ix, p. 453 (1882).

Euplœa distanti, Distant, Rhop. Malay., p. 32, n. 13, pl. v, fig. 9, *male* (1882).

Crastia distanti, Moore, Proc. Zool. Soc. Lond., 1883, p. 278, n. 5, pl. xxix, fig. 6, *male.*

Moore. Hagen as *distanti* [sic]. Distant as *distanti* [sic]. Originally described from Sumatra. Never found at the higher elevations in the hills, and is more plentiful near the sea; especially so in both sexes on both sides of the Wampoe River near the village of Stabat. It is the commonest of the brown *Euplœas* in our area. Both sexes exhibit very many variations in the shade of the brown colour of both wings. The male has sometimes absolutely no "male-mark" as should be exhibited according to Mr. Moore's definition of his group A; there is sometimes a small one on the upperside of the forewing in the submedian interspace; sometimes there is a large narrow mark; sometimes a large broad mark as in Mr. Moore's group B. In some hundreds of specimens which I have examined I have found every intergrade between these four forms, which goes to prove that in some groups of *Euplœas* the "male-marks" cannot be used in even a subgeneric sense. Dr. Hagen as late as 1889 noted that *E. distantii* is everywhere very common around the feet of the traveller. It may here be mentioned that all the brown *Euplœeus*:—*bremeri*, *moorei*, *distantii* and *ægyptus* (which follows) were all more or less plentiful in Deli so long as there were forests. But owing to the cultivation of tobacco all the forests have been cut down, the brown *Euplœas* have become rarer and rarer in the true tobacco districts, but may still be found as plentifully as in former years only on the boundaries of Deli, Langkat and Serdang, where again the forests commence. Even *E. distantii* is now decidedly rare in Deli and Langkat proper.

30. *EUPLŒA (*Crastia*) INCONSPICUA, Moore.

Crastia inconspicua, Moore, Proc. Zool. Soc. Lond., 1883, p. 279, n. 10.

Moore. Originally described from Sumatra. Unknown to us.

31. *EUPLŒA (*Crastia*) AMYMONE, Godart.

Danais amymone, Godart, Enc. Méth., vol. ix, p. 179, n. 11 (1819).
Crastia amymone, Moore, Proc. Zool. Soc. Lond., 1883, p. 279, n. 13.

Butler. Moore. Described by Godart from Amboina, recorded from China and Cochin China by Moore. Unknown to us.

32. *EUPLŒA (*Crastia*) FELDERI, Butler.

Euplœa felderi, Butler, Proc. Zool. Soc. Lond., 1866, p. 275, n. 20.

Butler. The type (a female) was from Sumatra. Recorded from Hong Kong by Moore. Unknown to us.

33. EUPLŒA (*Trepsichrois*) LINNÆI, Moore.

Trepsichrois van-deventeri, Forbes, A Naturalist's Wanderings, p. 274 (1885).

Forbes as *van-deventeri*. Grose Smith as *midamus*. Snellen as *midamus*. Hagen as *midamus*. Hagen also gives "var. *mulciber*, Distant [sic]. Butler as *midamus*. Staudinger as *midamus*. Distant as *midamus*. Moore. The commonest species of *Euplœa* both in the plains and hills in Sumatra. It is found all the year round and always in fresh generations. Of all the species of *Euplœa* it is the most mimicked, in the female by the female of *Elymnias laisidis*, de Nicéville; in the male by the third form of the female of *Euripus halitherses*, Doubleday and Hewitson; in the male by the first form of the female of *Hypolimnas anomala*, Wallace; also *Papilio butleri*, Janson, in both sexes mimicks both sexes of this *Euplœa*. The scent of *Euplœa linnæi* reminds Dr. Martin of "Worcester Sauce." The males are variable; in one variety the spots on the upperside of the forewing are violet, in another they are white. These latter specimens would appear to agree with *E. mulciber*, Cramer, described by him from China and the Coromandel Coast (the latter locality is certainly erroneous), but restricted by Moore to the islands of Borneo and Billiton. My male specimens of *Trepsichrois* from Borneo do not at all agree with Cramer's figure of "*Papilio*" *mulciber*, having the spots on the upperside of the forewing very small (much smaller than in typical *E. linnæi*) and violet, instead of large and white as portrayed by Cramer.

34. EUPLŒA CASTELNAUI, Felder.

Hagen. Never occurs in Deli, Langkat and Serdang, all the specimens from Sumatra—about a dozen—in Dr. Martin's collection were caught by his brother, Dr. Friedl Martin, in Asahan, south of our area; still further south of Asahan, at Indragiri, where Dr. F. Martin also collected, he failed to get *E. castelnaui*. At Penang it occurs close to the sea-shore, but it flies high and is not easily caught. It is always solitary, several specimens are never seen together.

35. EUPLŒA (*Calliplœa*) EUNUS, de Nicéville, n. sp.

Grose Smith as *ledereri* and *mazares*. Hagen as *ledereri*. Moore as *ledereri*. Staudinger as *mazares*.

HABITAT: N.-E. Sumatra.

EXPANSE: ♂, 2·5 to 2·9; ♀, 2·7 to 3·0 inches.

DESCRIPTION: MALE and FEMALE. Allied to *E.* (*Calliplœa*) *mazares*, Moore, from Java, but differing therefrom in having the UPPERSIDE of *both wings* almost entirely unglossed with purple, while that species has the anterior two-thirds of the forewing and a small patch in the middle of the hindwing purple-glossed; the white, violet-glossed spots on both wings the same.

E. eunus, de Nicéville, from Sumatra, *E. mazares*, Moore, from Java, *E. ledereri*, Felder, from the Malay Peninsula, and *E. aristotelis*, Moore, from Borneo, can be arranged in a regular series by the extent of the purple-glossing of both wings on the upperside, *E. eunus* being the least, *E. aristotelis* the most purple-glossed; the latter, indeed, if I have correctly identified it, having the whole of the forewing and a considerable area on the hindwing very rich iridescent purple.

This species is never found at high elevations, not even as high as Bindjei, but always close to the sea. It is very plentiful on the river banks of the Wampoe near Kampong Inei and Stabat, and is found in company with *Danais hegesippus*, Cramer, and *Euplœa distantii*, Moore, the *Danainæ* of the lowest elevations For twelve years Dr. Martin did not succeed in obtaining a female, only in the last two years were females found in considerable numbers by the imported Lepcha collectors from India, but that sex is always much rarer than the male.

36. EUPLŒA (*Danisepa*) DIOCLETIANUS, Fabricius.

Grose Smith as *rhadamanthus*. Snellen as *radamanthus* [sic], and *rhadamanthus*. Hagen as *diochtianus* [sic], and *rhadamanthus*, Horsfield [sic]. Staudinger as *rhadamanthus*. Distant. Moore. Mr. Moore has recently shewn that Fabricius described "*Papilio*" *diocletianus* from a female, and "*Papilio*" *rhadamanthus* from a male of the same species, so the earlier name applied to the species is here used irrespective of the sex. Is rather a common species in the plains, and occurs in the outer hills as high as Bekantschan; the female is always much rarer than the male. The male is mimicked by *Papilio velutinus*, Butler, and also by the first and second forms of *Euripus halitherses*, Doubleday and Hewitson.

37. *EUPLŒA (*Selinda*) ELEUSINA, Cramer.

Snellen records a single male from Sumatra. But for this solitary identification the species has always been considered to be confined to Java.

38. EUPLŒA (*Salpinx*) LEUCOSTICTOS, Gmelin.

Grose Smith as *novaræ*. Hagen as *novaræ*. Butler as *vestigiata*. Distant as *vestigiata*. Very rare in Sumatra, perhaps commoner in Java than elsewhere. I have during many years past added to my collection every specimen of this group of *Euplœa* I could obtain, and now that I have very extensive material to compare, I find that it is quite impossible to separate *E. leucostictos*, described in 1789, *E. dehaani*, Lucas (1853), *E. novaræ*, Felder (1862), *E. vestigiata*, Butler (1866), *E. leucogonys*, Butler (1879), and *E. lazulina*, Moore (1883). The species is obviously a variable one, the variations which it exhibits are not confined to particular localities, but are shewn wherever it is found. Mr. Moore in Proc. Zool. Soc. Lond., 1883, restricts *E. novaræ* to the Nicobar Isles and Tenasserim, *E. vestigiata* to Sumatra, *E. lazulina* to Malacca, *E. leucogonys* to Malacca, *E. leucostictos* to Java, and *E. dehaani* to Java. All *Euplœas* in Sumatra, both the brown and blue ones, even the rare *E. leucostictos*, are exceedingly fond of spots where there is shade from the direct sunlight, especially where there is dead wood, so that they may frequently be found in the open verandahs of houses near the forest, or on wooden bridges over rivers, which in Sumatra are almost always furnished with an attap roof made of palm leaves to protect the woodwork from the rain. To these places do the *Euplœas* resort, for a short time emerging into the sunlight and exhibiting their lovely iridescent colours, then returning to the favourite spot on wood, where they rest with folded wings; this evidently much-enjoyed sport of the butterflies continuing the whole day till three or four o'clock in the afternoon, when the lengthening shadows warn them that it is time to retire to their resting places in the adjoining forest, where they spend the night. It was on one of these wooden bridges that Dr. Martin obtained his first *E. leucostictos*.

39. *EUPLŒA (*Isamia*) CHLOE, Guérin.

Distant. Butler.

40. *EUPLŒA (*Isamia*) DEJEANI, Distant.

Distant. Moore. Mr. Distant expresses the opinion that this species "May be but an extreme variety of *E. chloë*," Guérin, which latter by Mr. Moore is restricted to Province Wellesley in the Malay Peninsula. I am also of this opinion, but keep it distinct for the present, as I have seen no specimen agreeing exactly with Mr. Distant's figure and description of *E. dejeani*.

41. *EUPLŒA (*Isamia*) SOPHIA, Moore.

Originally described from Sumatra by Moore.

42. EUPLŒA (*Isamia*) ÆGYPTUS, Butler.

E. ægyptus, Snellen, Midden-Sumatra, Lepidoptera, p. 12, n. 2, pl. i, figs. 1-3, *male* (1892).

Grose Smith. Snellen. Hagen. Kirby. Moore. A rather rare species in the plains, and found on the lower slopes of the hills as high as Bekantschan. The female is excessively rare. I have retained this name for the species of *Isamia* (I have been able to recognise only one) occurring in Sumatra, as so many authors have identified the Sumatran form of *E. chloë*, Guérin (which is the oldest name for the species of this group) under it. But I am very strongly of opinion that instead of four species of *Isamia* as recorded above occurring in Sumatra there is only one, and moreover, that several other species kept separate by Mr. Moore should be added to the synonymy.

43. *EUPLŒA (*Narmada*) CONSIMILIS, Felder.

Moore. Originally described from Java. Unknown to us from Sumatra.

44. EUPLŒA (*Narmada*) MARTINII, de Nicéville.

E. (*Narmada*) *martinii*, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. viii, p. 38, n. 2, pl. K, figs. 3, *male*; 4, *female* (1893).

Not uncommon in the higher mountains and on the Central Plateau, but never below 3,000 feet elevation. In this species both sexes were almost always brought in equal numbers. It is almost unrivalled in the male in the rich velvety deep black coloration of its upperside.

45. EUPLŒA (*Stictoplœa*) HARRISII, Felder.

Grose Smith as *tyrianthina*. Hagen as *thyriantina* [sic]. Moore as *tyrianthina*. As I can exactly match Sumatran specimens of *E. tyrianthina*, Moore, with Khasi Hill examples of *E. harrisii*, Felder, I record the species under the latter name, as it is much the older. *E. harrisii* is richly blue-glossed, in spite of Mr. Moore having stated the contrary in Lepidoptera Indica, vol. i, p. 138 (1891). In Sumatra it is, as this species goes, fairly constant, though the spots on both wings as usual shew considerable variation both as to size and number. I possess some which coincide precisely, spot for spot, and in the extent of the blue coloration, with Mr. Moore's figure of *Stictoplœa crowleyi* (l.c., pl. lii, fig. 2, *male*). For notes on the variability and synonomy of *E. harrisii*, see de Nicéville, Proceedings Asiatic Society Bengal, 1892, n. 158. In Sumatra it is found in the alluvial plain and also as high as Bekantschan and Kepras in the hills. The female is as usual very rare. Dr. Martin caught his first male specimen under the roof of a wooden bridge over the Bindjei river near Namoe Oekor.

46. *EUPLŒA (*Stictoplœa*) PICINA, Butler.

E. picina, Butler, Proc. Zool. Soc. Lond., 1866, p. 280, n. 36, pl. xxx, fig. 1, *male*.

Butler. Moore. Originally described from Sumatra. Unknown to us.

47. *EUPLŒA (*Stictoplœa*) INCONSPICUA, Butler.

Butler. Moore. Originally described from Sumatra. Unknown to us.

Subfamily SATYRINÆ.

48. MYCALESIS (*Satoa*) MAIA, de Nicéville.

M. (Satoa) maia, de Nicéville, Journ. A. S. B., vol. lxiii, pt. 2, p. 1, n. 1, pl. i, figs. 1, *male*; 2, *female* (1894).

Grose Smith as *maianeas.* Snellen as *majaneas* [sic]. Hagen as *maianeas.* Occurs only in the large forest, and never at low elevations, its region commencing at Namoe Oekor and thence into the hills. It is always found on or very near to the ground. Very easily damaged, hardly ever is a perfect specimen obtained.

49. *MYCALESIS (*Dalapa*) SUDRA, Felder.

Moore. Not rare in Java, unknown to us from Sumatra.

50. MYCALESIS (*Suralaya*) ORSEIS, Hewitson.

Grose Smith. Hagen. Snellen. Kirby. Distant. Also a true butterfly of the high forest, and is the only Sumatran *Mycalesis* which has a bluish gloss on the upperside of the wings as so many forest butterflies have in a greater or less degree, such as the *Cœlites, Thaumantis, Amathuxidia dilucida*, Honrath, and others; even the *Lampides* of the forest, *L. saturata*, Snellen, *L. elpis*, Godart, and *L. subdita*, Moore, are far richer and deeper blue than the *Lampides celeno*, Cramer, of the roads.

51. MYCALESIS (*Orsotriæna*) MEDUS, Fabricius.

Hewitson as *hesione.* Snellen as *hesione.* Grose Smith as *hesione.* Hagen. Distant. Very common in the plains. The dry-season form of the species found in many parts of India, *M. runeka*, Moore, is quite unknown in Sumatra. Dr. Martin has bred it in Sumatra on grass, from eggs laid by females shut up in glass prune bottles. He considers that *Orsotriæna* should be used in its full generic sense, as the larva and and pupa differ greatly from the larvæ and pupæ of species of *Calysisme* and *Mydosama* which he has also bred from the egg laid in confinement, the larvæ of these subgenera also feeding on various species of grass. *M. medus* in Sumatra occurs all the year round, generation following generation in rapid succession. Dr. Martin notes that "The ocelli on the underside of the wings possess in this species a quite peculiar glossy surrounding, which I know to occur only in the Indian genus *Zipœtes*, Hewitson."

52. MYCALESIS (*Calysisme*) PERSEUS, Fabricius.

Grose Smith as *samba* and *lalassis.* Hagen as *blasius*, var. *lalassis*, Hewitson. *M. blasius* is the wet-season, and *M. perseus* the dry-season form of one and the same species; the latter is not found in Sumatra. *M. lalassis* is confined to Gilolo and Amboina according to Mr. Moore. Not uncommon in the plains, but occurs less frequently than *M. mineus*, Linnæus, and *M. horsfieldii*, Moore.

53. *MYCALESIS (*Calysisme*) POLYDECTA, Cramer.

Snellen as *justina*. Butler. Mr. Moore gives the "*Papilio*" *justina*, Cramer, which was described from the Coromandel Coast of South India, as a synonym of *M. polydecta*, and restricts the species to Eastern, Central, and Southern India, and Ceylon. As the figure of *M. justina* is very similar to the wet-season form of *M. mineus*, Linnæus, while the figure of *M. polydecta* reminds one at once of the recently-described *M. horsfieldii*, Moore, it is, I think, probable that Messrs. Snellen and Butler have incorrectly recorded this species from Sumatra. Dr. Hagen gives *M. justina* as a synonym of *M. mineus*.

54. MYCALESIS (*Calysisme*) MINEUS, Linnæus.

Hewitson. Grose Smith as *ostrea*. Hagen as *drusia*, and as *mineus*, Butler [sic]. Distant. Mr. Moore considers that both *M. mineus* and *M. drusia*, Cramer, represent the wet-season form of one and the same species. No dry-season form of it (*M. otrea*, Cramer, *nec M. ostrea*, Westwood, which also equals the dry-season form of *M. mineus*), occurs in Sumatra. It is the commonest species of *Mycalesis* found in the island, and flies everywhere with *M. medus*, Fabricius, where there is grass and a little jungle for it to retire into.

55. MYCALESIS (*Calysisme*) HORSFIELDII, Moore.

Calysisme horsfieldii, Moore, Lep. Ind., vol. i, p. 197, pl. lxvi, figs. 2, *2a*, *2b*, *male, wet-season form*; *2c*, *dry-season form* (1892).

The dry- and wet-season forms of this species differ but little. I have specimens also from Nias Island and Java. *M. mineus*, Linnæus, *M. perseus*, Fabricius, and *M. horsfieldii* all occur at the same time and place, so there can be no question of one being perhaps a seasonal form of the other. Besides, the "male-marks" of the three species differ considerably, that of the latter on the upperside of the hindwing being very much larger than those of the other two species. Dr. Martin has bred this species as well as *M. mineus*, *M. janardana*, Moore, and *M. anapita*, Moore, from eggs laid by confined females; the larval stage of all four being very similar and not easy to be differentiated, if mixed together. *M. horsfieldii* and *M. anapita* would not eat the common ubiquitous *Gramineæ*, so he had to give them other and rarer kinds of grass. *M. horsfieldii* is common in the plains of Sumatra, the female rarer than the male.

56. MYCALESIS (*Oulapa*) MNASICLES, Hewitson.

M. mnasicles, Hewitson, Ex. Butt., vol. iii, pl. *Mycalesis* v, figs. 32, 33, *male* (1864).

Hewitson. Grose Smith. Hagen as *mnasicles* [sic]. Distant. Kirby. Originally described from Sumatra. Rather rare in the forests and in pepper gardens; not found at so low an elevation even as Namoe Oekor, somewhat plentiful at Loeu Boentoe near the Battak frontier. This species is the largest of all the Sumatran *Mycalesis*, and small males only may be equalled in size by very large females of *M. mineus*, Linnæus, or *M. orseis*, Hewitson. The shape of the forewing also is very different from all our other species of the genus.

57. MYCALESIS (*Martanda*) JANARDANA, Moore.

Grose Smith. Snellen. Hagen. Distant. Occurs not uncommonly in the forests of the plains. The large deep velvety black spot — which is a "male-mark"—in and around the discoidal cell of the forewing on the upperside of the male, and the mottled underside of both wings makes this species of easy recognition. The caterpillars feed only at night. The butterfly emerges from the pupa very late in the day, not before two or three o'clock P. M., all the other species bred by Dr. Martin emerged between nine and ten o'clock A.M. It flies mostly at dawn and the dusk of the evening, and is a good example of the crepuscular habits of so many tropical butterflies.

58. *MYCALESIS (*Martanda*) MEGAMEDE, Hewitson.

Hewitson. Grose Smith. Originally described from Ternate; Hewitson records it from Macassar in Celebes, Gilolo, Batchian, Ternate, Sumatra, Malacca and Java; Moore records it from Celebes, Gilolo and Batchian. It is unknown to us.

59. MYCALESIS (*Mydosama*) FUSCUM, Felder.

Hewitson as *diniche*. Snellen. Grose Smith as *diniche* twice over. Hagen. Distant as *fusca* [sic]. Common in the forests at the foot of the hills and also in the plains, near rivers, and at Stabat. In coloration it is intermediate between the fuscous and yellow species of *Mycalesis*.

60. MYCALESIS (*Mydosama*) ANAPITA, Moore.

Hewitson. Grose Smith. Snellen. Hagen. Common in the forests of the plains.

61. MYCALESIS (*Mydosama*) MARGINATA, Moore.

Mydosama marginata, Moore, Trans. Ent. Soc. Lond., 1881, p. 307.

Moore. Hagen. Originally described from Sumatra. Occurs only on the Central Plateau at an elevation of not less than 3,000 feet at least. It is quite common where it is found, and is endemic to the Battak mountains.

62. MYCALESIS (*Mydosama*) DOHERTYI, Elwes.

M. dohertyi, Elwes, Proc. Zool. Soc. Lond., 1891, p. 261, pl. xxvii, figs. 3, *male*; 4, *female*.

Described from Perak in the Malay Peninsula. Dr. Martin obtained a single male from Selesseh, and later a female from Soekaranda, and in 1894 one pair from Bekantschan. It is one of the rarest butterflies in Sumatra, as in thirteen years' collecting he only obtained these four specimens.

63. *MYCALESIS (*Mydosama*) ASOPHIS, Hewitson.

Grose Smith. Originally described from Mysol. Recorded also from New Guinea, Waigiou and Ternate by Moore. Unknown to us.

64. MYCALESIS (*Loësa*) OROATIS, Hewitson.

Hagen as *oroatis* and *ustulata*. Mr. F. Moore allows *L. surkha*, Marshall, to stand for this species, in preference to *L. fervida*, Butler, which is an older name, being the first published. Colonel Marshall's description of *M. surkha* was read before Mr. Butler's paper was published, but that does not give priority. *M. fervida*, *M. surkha* and *M. ustulata*, Distant, are all synonyms of *M. oroatis*, described from Java. The first two names represent dry-season, the last two wet-season forms of one and the same species. The dry-season form certainly does not occur in Sumatra, it is unknown to me if it is found in Java. *M. oroatis* is somewhat uncommon in the lower hills at Namoe Oekor, Namoe Tambis, and Bekantschan. It is the darkest of the yellow species of *Mycalesis* found in Sumatra. Females are rare.

65. *MYCALESIS MEDUSA.

Grose Smith. This species does not appear to have ever been described.

66. *MYCALESIS BOCKII.

Grose Smith. Also apparently nondescript.

It may perhaps be here noted that all the Sumatran species of *Mycalesis* are very earth-loving insects, they always keep close to the ground, which they only leave for higher flights on two occasions, *viz.*, during the wedding flight, and when two jealous males meet and fight. *Mycalesis* are out on rainy days when there is no sun, and give on such days some occupation and consolation to the otherwise disappointed collector. All the species are very fond of fæces of all kinds and of sweets, and are often very numerous on pieces of sugar-cane which the natives have thrown away after removing all the sweet juice possible by mastication or otherwise. They are also very partial to the red saliva of the betel-chewing natives.

67. NEORINA LOWII, Doubleday and Hewitson.

Hewitson as *Cyllo lowii.* Grose Smith. Snellen as *Hipio lowii.* Hagen as *Hipio lowii.* Staudinger. Distant. Kirby. Occurs only in the lower hills and is not very common, and when caught is nearly always in a damaged condition. They are very fond of the juice of some forest trees, which give forth this liquid when the bark is cut or wounded. Every observer who has seen it flying has noted its strong likeness to *Papilio helenus,* Linnæus. This, however, is not a case of mimicry but of accidental resemblance only, as *P. helenus* is not a protected butterfly. Dr. Martin considers that in its shape and habits it is very near to the genus *Melanitis,* being only a gigantic form of the genus.

68. AMNOSIA EUDAMIA, Grose Smith.

A. eudamia, Grose Smith, Nat. Wand. East. Arch., p. 275 (1885).
A. martini, Honrath, Berl. Ent Zeit., vol. xxxvi, p. 439 (1891).

Grose Smith as *decora* and *eudamia.* Snellen as *decora.* Hagen as *decora.* The late Professor Westwood originally described the genus *Amnosia,* and placed it in the subfamily *Nymphalinæ* immediately before *Cyrestis.* Kirby and Staudinger retain it in the same position. The late Dr. Schatz placed it between *Stibochiona* and *Hestina.* Dr. Hagen has struck out an independent course, and places it in the subfamily *Amathusiinæ,* between *Enispe* and *Clerome.* I am of opinion that it should come into the subfamily *Satyrinæ* near to the genus *Neorina.* The presence of ocelli in the subfamily *Nymphalinæ* is rare, and when found in such genera as *Precis, Junonia, Apatura, Cynthia, Rhinopalpa, Doleschallia, Kallima,* &c., differ in character from the ocelli found in the *Satyrinæ.* The yellow form of female of *A. eudamia* agrees strikingly in shape, facies, and its naked eyes with *Neorina hilda,* Westwood, the type of the genus, having the veins of the forewing non-swollen at the base, and a broad oblique yellow band across the disc of that wing. In these features it also strongly resembles *Melanitis amabilis,* Boisduval, from New Guinea. *Amnosia* differs from *Melanitis,* however, in having the second median nervule of the hindwing arising at the end of the discoidal cell, instead of well before the end; in this it agrees with *Neorina. Amnosia* differs from *Neorina* in the direction of the disco-cellular nervules of the forewing; and in having the second median nervule of that wing arising at the lower end of the cell instead of long before the end. All the genera of the *Amathusiinæ* have to my eyes a facies peculiar to themselves not seen in *Amnosia*; besides which in all the genera except *Xanthotænia* the discoidal cell of the hindwing is open or only partially closed, in the *Satyrinæ* it is closed entirely, *Amnosia* therein agreeing with the latter. The genus at present contains four species, *A. decora*, Doubleday and Hewitson, from Java, *A. eudamia*, Grose Smith, from Sumatra, *A. baluana*, Fruhstorfer, from North Borneo, and *A. decorina*, Fruhstorfer, from Nias. The male of *A. eudamia* differs from that sex of *A. decora* in having the oblique blue band on the upperside of the forewing broader, paler, and of a more silvery hue. The female of *A. eudamia* is dimorphic, one form having the band yellow, the other having it white; specimens somewhat intermediate between these two forms, the band being yellowish-white, are sometimes obtained. Dr. Martin informs me that he has received both forms of *A. decora* from Java also. He took the first white females of *A. eudamia* ever obtained to Europe in 1889, from them the late Herr Honrath created the species *Amnosia martini*, not being aware that Mr. Henley Grose Smith had already described the species from specimens obtained by Mr. Henry O. Forbes. Dr. Martin captured his first specimens himself in 1889 in Deli, south of Kampong Roemah Kenangkong. It occurs also in the forests at high elevations south of Bekantschan, in the Battak mountains, and on the Central Plateau, but is by no means common, as is the Javan species, so Mr. Fruhstorfer informs us, in suitable localities.

69. CŒLITES EPIMINTHIA, Westwood.

Grose Smith. Hagen. Distant. Kirby. Rare, and occurs in dense forests only as high as Namoe Oekor.

70. CŒLITES HUMILIS, Butler.

Grose Smith as *euptychoides* [sic]. Hagen as *euptychoides* [sic]. Very rare, Dr. Martin has obtained two or three specimens only. It may be known from the *C. euptychioides* of Felder, which is apparently confined to Borneo, by the female being devoid of all ultramarine-blue coloration on the upperside of the hindwing. The pupils of the ocelli on the underside of all the species of the genus are of a lovely iridescent blue colour which is only visible in some lights. This is also the case in the allied genus *Ptychandra*, Felder, from the Philipines.

71. *CŒLITES NOTHIS, Doubleday and Hewitson.

Hagen. This rare species was described from "East India." M. Charles Oberthür possesses two males and a female, and there is a female in the British Museum; these are all the known specimens. Its precise habitat is unknown.

In Sumatra the species of *Cœlites* are inhabitants of dense virgin forests, are very shy, but settle often, and can only be captured by approaching them most gently and carefully. They always rest with folded wings, and are not easily seen on the dark ground covered with leaves of all shades in the dim recesses of the forest. Their shyness and the difficulty of discovering and capturing them may be the real reason why they are so seldom met with in collections. Dr. Martin is of opinion that *Neorina lowii*, Doubleday and Hewitson, is a gigantic *Melanitis*, so he would call the species of *Cœlites* the *Melanitis* of the forest. Being true forest insects they exhibit a beautiful glossy blue colour (confer *Mycalesis orseis*, Hewitson, *ante* No. 50).

72. LETHE (*Nemetis*) MINERVA, Fabricius.

Hewitson as *arcadia*. Grose Smith as *arcadia*. Snellen as *arcadia*. Kirby. Apparently very rare in North-Eastern Sumatra, Dr. Martin having obtained one specimen only from the mountains. It is far less rare in Java.

73. LETHE (*Debis*) MEKARA, Moore.

Hewitson. Grose Smith. Hagen. Semper. Snellen. Common everywhere in the plains, in the mountains, and even on the Central Plateau; the specimens from the mountains have the yellowish-red colour on the upperside of the hindwing more extensive than those from the plains. The insect is always met with near bamboos, on which the larva feeds, and is even very common in Bindjei.

74. LETHE (*Debis*) CHANDICA, Moore.

Hagen. Very rare, in the higher mountains and on the Central Plateau. Dr. Martin has not obtained more than ten or twelve specimens during his long sojourn in the island.

75. LETHE (*Debis*) DARENA, Felder.

L. darena, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. viii, p. 40, n. 3, pl. K, fig. 7, *male* (1893).

Very rare in the Battak mountains, and not found below 3,000 feet elevation. Dr. Martin wishes to add:—"I cannot lose this opportunity to present my compliments to my friend Mr. Lionel de Nicéville for his extraordinary entomological knowledge and keen insight in having seen only the drawing of the very different female of *Lethe darena* in Dr. Felder's Reise Novara, Lepidoptera, and from that being able to determine the first male obtained by me, which I took to him on paying my first visit to Darjiling, after I had had the animal returned to me as undeterminable from Berlin. Afterwards I sent collectors especially to the mountains to obtain females, when de Nicéville's identification was splendidly confirmed. As far as I am aware, no specimens from Java, from whence this species was first obtained, have been recorded since the female was described by Dr. Felder. *L. darena* is doubtless one of the rarest, as well as one of the most beautiful, if not the most beautiful, species in this large genus."

76. LETHE EUROPA, Fabricius.

Snellen. Hagen as *europa* and *arete*. Distant. Occurs in nearly the same localities as *L. mekara*, Moore, and has the same habits but is considerably rarer, especially the female. Dr. Hagen records both *L. europa* and *L. arete*, Cramer, from Sumatra. The latter, according to Mr. F. Moore, is found in the Sula islands and Amboina only, while *L. arcuata*, another allied species described by Butler, is confined to Celebes.

77. LETHE ROHRIA, Fabricius.

Snellen. Hagen. A common species, but confined to the Central Plateau of the Battak mountains.

78. *YPTHIMA CEYLONICA, Hewitson.

Elwes. Unknown to us from Sumatra. It occurs on the eastern coast of India (Orissa and Ganjam), in South India, and in Ceylon.

79. YPTHIMA BALDUS, Fabricius.

Hewitson. Grose Smith. Hagen as *methora*, Fabricius [sic]. Elwes. Probably the commonest species of *Ypthima* in the plains and found everywhere. The larva feeds on the same ubiquitous *Gramineæ* as *Mycalesis mineus*, Linnæus. Dr. Hagen evidently followed Mr. W. L. Distant in Rhop. Malay., who described and figured this species erroneously under the name of *Y. methora*, Hewitson. No species of *Ypthima* presents dry-season forms in Sumatra, all are strongly ocellated.

80. YPTHIMA IARBA, de Nicéville.

Y. iarba, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. x, p. 318, n. 4, pl. R, figs. 7, *male*; 8, *female* (1895).

Very rare, in all Dr. Martin has not obtained more than a dozen specimens. It is of large size, 1·6 to 1·8 inches in expanse, and has five ocelli only on the hindwing, a pair at the anal angle, a pair in the median interspaces, and a single one in the upper subcostal interspace.

81. YPTHIMA PHILOMELA, Johanssen.

Snellen as *hübneri*. Hagen as *hübneri*. Distant as *hübneri*. Common everywhere in the plains like *Y. baldus*, Fabricius. I follow Mr. Moore in my identification of this species (Lep. Indica, vol. ii, p. 74, pl. cx, fig. 4, *male* (1893), which he records from Sumatra. It is of small size, has six ocelli in pairs on the underside of the hindwing, and has an inconspicuous patch of androconia on the upperside of the forewing. The *Y. huebneri* of Kirby, under which name the present species has apparently been recorded by three writers from Sumatra, is quite a distinct species, with no "male-mark," and with four ocelli only placed one and three, and does not appear to occur in the island. The *Y. tabella* of Marshall, from South India and Burma, of which the type specimen is in my collection, appears to me to be the same as *Y. philomela* of Johanssen. Mr. Elwes in his monograph of the genus *Ypthima* places the "*Papilio*" *philomela*, Johanssen, as a synonym of *Y. baldus*, Fabricius, but with a query. He gives *Y. tabella* as a certain synonym of *Y. baldus*. Nowhere does Mr. Elwes refer to the *Y. philomela* of Linnæus. All Mr. Moore says about it is that it is quite distinct from *Y. hübneri*, Kirby, and has six ocelli on the hindwing disposed in three pairs (Lep. Ind., vol. ii, p. 81). I am, therefore, quite in the dark as to how *Y. philomela*, Johanssen, and *Y. philomela*, Linnæus, are supposed to differ. Mr. Moore gives the *Y. philomela* of Hübner as a synonym of *Y. huebneri*, Kirby.

82. YPTHIMA PANDOCUS, Moore.

Snellen. Hagen. Distant as *corticaria*. Occurs in Sumatra only on the Central Plateau of the Battak mountains at an elevation of not less than 3,000 feet. Mr. Moore retains *Y. corticaria*, Butler, as a distinct species; I quite agree with Mr. Elwes in placing it as a synonym of *Y. pandocus*. Mr. Distant treats *Y. corticaria* as a "var." of *Y. pandocus*.

83. YPTHIMA FASCIATA, Hewitson.

Hewitson. Grose Smith. Distant. Kirby. Elwes. Decidedly rare, occurs only in the forests of the lower hills rarely at Namoe Oekor, but never at a lower elevation. Like the species of *Mycalesis* all the species of *Ypthima* are not as fond of the sun as most other butterflies, and fly on rainy days. They are partial to flowers, and will even go to high shrubs when in blossom, which *Mycalesis* will never do.

84. RAGADIA CRISIA, Hübner.

Hewitson. Snellen. Hagen. Distant. A common species in the plains and is found not only in the large and high forests, but also in young and not very high jungle with the ground covered with grass which it prefers. Often met with in pepper gardens; plentiful at Batoe Gadjah near the Begôemit river. It has a very weak flight, often settles, and is easily captured. It is very variable in both the shade of the ground-colour of the upperside and the extent of the white on the underside, some specimens having the white bands fully twice as broad as others.

85. *RAGADIA MAKUTA, Horsfield.

Mr. Moore records *R. crisia*, Hübner, from the Malay Peninsula and Borneo, and *R. makuta*, Horsfield, from Sumatra and Java. I have an extensive series of *Ragadias* from all these localities, and while these specimens shew great variation in the colour of the ground and the respective width of the bands, it appears to me obvious that they all represent one species. Until the publication of vol. ii of Mr. Moore's "Lepidoptera Indica," p. 113 (1893), *R. makuta* was always given as a synonym of *R. crisia*, and Mr. Moore in that work does not give his reasons for separating them.

86. ERITES ELEGANS, Butler.

Hagen. The rarest of the three Sumatran species of the genus.

87. ERITES ARGENTINA, Butler.

Grose Smith as *madura* [sic]. Hagen. Somewhat rare.

88. ERITES ANGULARIS, Moore.

Hewitson as *madura* [sic], var. The commonest species of the genus occurring in Sumatra. *E. medura*, Horsfield, is confined, as far as our present knowledge extends, to Java and Palawan in the Philippines. All the species of *Erites* are true forest butterflies, and they are not only found in the large virgin forests, but also in younger jungle with plenty of grass under foot. At an elevation of 1,200 feet they disappear. On the wing they remind one of *Ragadia*, as they also have a very weak flight, and often settle with closed wings. It is a very interesting fact that in such a relatively small area as are the districts of Deli, Langkat, and Serdang, three quite distinct species of this rather small genus should be found. (*Confer* de Nicéville, Journ. A. S. B., vol. lxii, pt. 2, p. 1 (1893).

89. MELANITIS ISMENE, Cramer.

Hewitson as *Cyllo leda*. Snellen as *Cyllo leda*. Hagen as *leda* and *ismene*. Distant as *leda* and *ismene*. The dry-season form (*ismene*) and wet-season form (*determinata*, Butler), occur together at the same time and at all seasons of the year, but are most plentiful in the rainy-season from October to January in rice-fields, on which the larva feeds, as well as on certain coarse species of grass. It is delightful to a lepidopterist who loves insects alive in their native haunts as well as dead, dried, and pinned in his cabinets to see two males fighting together and flying up very high into the air, then returning with periodical regular movements to the spots from whence they started. As this happens mostly after sunset, the silhouettes of the insects are very sharp and clear against the golden evening sky of the tropics. In consequence of the well-known habit of *Melanitis* to be on the wing before sunrise and after sunset, it sometimes comes into the lighted open verandahs of the houses—quite a stranger amongst a crowd of moths and insects of all orders.

90. MELANITIS BELA, Moore.

Hagen as *suyudana.* Semper as *suyudana.* Decidedly rare, and has nearly the same habits as *M. ismene*, Cramer, but prefers small jungle rather than the borders of fields, gardens, &c. Like *Neorina lowii*, Doubleday and Hewitson, it is exceedingly fond of the sap from certain trees. Dr. Hagen has quite correctly observed that in the early morning hours *M. bela* is still earlier on the wing than *M. ismene*, and that it has already retired to rest as that species and some *Mycalesis* appear. *M. bela* occurs under two forms:—the one which corresponds to the wet-season form of the species in India (*aswa*, Moore), has the upperside of the wings in the male velvety-black, with the apex of the forewing but very slightly angulated; the other, which corresponds to the dry-season form of the species in India (true *bela*), has the upperside of the wings in the male much paler, of a rusty-brown hue, often with subapical spots in the forewing on the upperside, with the apex of the wing strongly angulated. The first of these forms equals *M. abdullæ*, Distant, the second *M. suyudana*, Moore. Mr. Moore in Lep. Ind., vol. ii, p. 137, continues to keep the two last-named species distinct, and records it from Sumatra under the name of *M. suyudana*, but as I possess good series of both from the localities whence they were described, I have no hesitation in sinking them both as synonyms of *M. bela.*

91. MELANITIS ZITENIUS, Herbst.

Distant. The rarest species of the genus occurring in Sumatra, and found only at the higher elevations from 500 to 2,000 feet. In thirteen years Dr. Martin has obtained a dozen specimens perhaps.

Subfamily ELYMNIINÆ.

92. ELYMNIAS NIGRESCENS, Butler.

Hagen. I have found great difficulty in identifying satisfactorily the common species of *Elymnias* of the *undularis* group occurring in Sumatra. Mr. Distant seems to have had similar difficulty with the Malay Peninsula species, *vide* Rhop. Malay., p. 61. *E. nigrescens* was described by Butler from Sarawak, Borneo, both sexes are described and one is figured, but it is not stated whether that figure was taken from a male or a female, but probably the latter. I have nothing very like it from Sumatra or Borneo. Distant figures two female specimens from the Malay Peninsula, which were presumably compared with the types, besides which Mr. Butler himself records *E. nigrescens* from the Malay Peninsula. Our specimens agree very fairly with Distant's two figures, so I have adopted the name he uses for it. The males have sometimes no blue coloration on the upperside of the forewing whatever, sometimes there is a more or less complete series of marginal spots, which are most prominent at the apex of the wing. The hindwing is usually immaculate, but sometimes there is a marginal series of whitish spots. The female is very similar to the male, but the ground-colour of the upperside is paler and more reddish, and the blue spots are usually more prominent. Sumatran specimens of both sexes are frequently smaller and duller-coloured than specimens from the Malay Peninsula and Borneo. No orange form of female (*E. undularis*, Drury, from India; *E. tinctoria*, Moore, from Burma; *E. fraterna*, Butler, from Ceylon; *E. discrepans*, Distant, from the Malay Peninsula; and *E. protogenia*, Cramer, from Java) is ever found in Sumatra. This species is by far the commonest of the subfamily occurring in the island, and is found in the plains all the year round in ever succeeding generations. The larva feeds on the rattan cane, and doubtless on various species of palms also.

93. *ELYMNIAS LEUCOCYMA, Godart.

Hagen as *leucocyma*, Godardt [sic]. This species was described from males from Java, and is evidently very closely allied to *E. undularis*, Drury, from India. May not *E. leucocyma* be a synonym of *E. protogenia*, Cramer? It is doubtful if two distinct species of this group are found in Java. Dr. Hagen records two species of *Elymnias* of this group from Sumatra, but I have only seen one, which, however, is decidedly variable, but cannot in my opinion be split up into separate species.

94. ELYMNIAS LUTESCENS, Butler.

Grose Smith as *panthera*. Hagen. Butler. Distant. Kirby.

Staudinger as *panthera*, Fabricius, var. *lutescens*, Butler. Wallace. Very rare in the forests of the plains and as high as 'Namoe Oekor. This insect is perhaps not really as rare as it appears to be; as it greatly resembles on the wing a brown *Euplœa*, it probably often from this cause escapes the notice of the collector.

95. ELYMNIAS DARA, Distant.

E. dara, Distant, Ann. and Mag. of Nat. Hist., fifth series, vol. xix, p. 50, n. 36 (1887).

This species was described from Northern Borneo. An allied species is the *E. albofasciata*, Staudinger, from Palawan in the Philippine Isles, described in Iris, vol. ii, p. 39 (1889). We have not had the opportunity of comparing *E. dara* and *E. albofasciata* from typical localities, but a female of the latter from Palawan kindly sent to me by Dr. Staudinger agrees exactly with Sumatran specimens of the same sex. The Burmese species, *E. dædalion*, de Nicéville, is certainly distinct from the Sumatran and Philippine form which we here identify as *E. dara*, but whether it is separable from *E. dara* from Borneo we cannot say. It is very rare in Sumatra, and has been brought in from the Gayoe and Battak mountains from high elevations only.

96. ELYMNIAS (*Melynias*) LAISIDIS, de Nicéville, n. sp.

Grose Smith as *lais*. Hagen as *lais*, Horsfield and Moore [*sic*]. Wallace as *lais*. Distant as *lais*.

HABITAT: N.-E. Sumatra.

EXPANSE: ♂, 2·9 to 3·3; ♀, 3·5 to 3·7 inches.

DESCRIPTION: MALE. Very similar to *E. lais*, Cramer, from Nias, Java, and Borneo. FEMALE. In general appearance very similar to the same sex of *E. malelas*, Hewitson, from Sikhim, Bhutan, Assam, and Burma, the wings being greatly elongated, and the *forewing* on the UPPERSIDE having the apical half strongly washed with purple.

I possess a single female only of *E. lais* from Java, from which the female of *E. laisidis* differs in its more elongated forewing glossed with purple on the upperside. Dr. A. R. Wallace has described but not named the Sumatran form of *E. lais* in Trans. Ent. Soc. Lond., 1869, p. 325, n. 11. *E. laisidis* occurs nearly always near human habitations, and Dr. Martin feels sure that the larva feeds on bamboos, as the females are always seen flying along the bamboo hedges surrounding the gardens of Malay houses. It occurs most commonly in December and January, and in some years (1892 and 1893) was unusually abundant, being seen almost in swarms. In India the allied *E. timandra*, Wallace, has been noted in the Khasi Hills of Assam occurring in thousands in some years in a similar manner. In other years *E. laisidis* is very rare, and then found near the sea coast (at Laboean) commoner than higher up. The female, on the vivid blue coloration of the upperside of the forewing of which the species is mainly based, is undoubtedly a very splendid mimic of *Euplœa linnœi*, Moore.

97. ELYMNIAS (*Melynias*) CERYXOIDES, de Nicéville.

E. (Melynias) ceryxoides, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. x, p. 22, n. 7, pl. S, fig. 13, *male* (1895).

Grose Smith as *ceryx*. Hagen as *ceryx*. Occurs only on the Central Plateau at not less than 3,000 feet elevation, and similarly to *E. laisidis* is found in June and July, but chiefly in December and January. Dr. Martin's brother, Dr. F. Martin, took it on the southern extremity of the Toba Lake near Batoe Gadjah, which is higher than the plateau.

98. ELYMNIAS (*Melynias*) ERINYES, de Nicéville.

E. (Melynias) erinyes, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. x, p. 19, n. 5, pl. R, figs. 9, *male*; 10, *female* (1895).

A very rare species found only in the high forest at Selesseh and at to the lower slopes of the hills at Bekantschan, and in the Battak mountains in September. Dr. Martin has obtained three specimens only. It is nearly allied to *E. casiphone*, Hübner, more closely to *E. kamara*, Moore.

99. ELYMNIAS (*Melynias*) DOHRNII, de Nicéville.

E. (Melynias) dohrnii, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. x, p. 21, n. 6, pl. S, fig. 12, *male* (1895).

This species was described from a single male obtained in September, 1894, at Bohorok near the Battak frontier by Herr M. Ude, the European collector of Dr. H. Dohrn of Stettin. As Bohorok is on the way to the Gayoe and Allas countries, it is possible that this *Elymnias* may occur there more plentifully, as these regions are quite unknown. It is allied to *E. patna*, Westwood.

100. ELYMNIAS (*Bruasa*) SUMATRANA, Wallace.

Wallace. Kirby. Grose Smith as *sumatrana* and *penanga*. Hagen as *penanga*, Westwood, var. *sumatrana*. Originally described from Sumatra. A very rare species. It occurs in March in the forests near the sea together with *Euplœa eunus*, de Nicéville. The female may be considered to be one of the rarest butterflies of our region; in all the time Dr. Martin was in Sumatra he only obtained three specimens, one of which he caught himself in a forest near the Saentis Estate, not more than two miles from the sea.

101. ELYMNIAS (*Bruasa*) ABRISA, Distant.

Very rare in the high forest near Selesseh in July and at Namoe Oekor. Both sexes are described by Mr. Distant, and the male is figured. We have seen only seven female specimens. But for the fact that Mr. Distant describes the male, we would certainly have considered this species to be a dimorphic form of the female of *E. sumatrana*, Wallace.

102. ELYMNIAS (*Agrusia*) ESACOIDES, de Nicéville.

Dyctis esacoides, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. vii, p. 323, n. 2, pl. H, fig. 2, *male* (1892).

Exceedingly rare, three specimens only have been obtained, one in the forest near Selesseh in July, two from the lower hills. All the rarer species of *Elymnias* have a soft weak flight and settle often with folded wings. They are very fond of shadowy spots and of rest, and once settled they remain for a long time, leaving their resting places only when frightened or driven away. As they all rest with shut wings they are in this position much less conspicuous than when on the wing.

Subfamily AMATHUSIINÆ.

103. ZEUXIDIA AMETHYSTUS, Butler.

Hagen. Kirby. Butler. Distant. Staudinger. Rare; found only in dense virgin forests like all the rest of the genus not at a lower elevation than Bekantschan in September. It occurs higher in the hills than any other *Zeuxidia*. The female has the macular band on the upperside of the forewing ochreous-white.

104. ZEUXIDIA NICEVILLEI, Fruhstorfer.

Z. nicévillei, Fruhstorfer, Ent. Nach., vol. xxi, p. 196 (1895).

Fruhstorfer. Described as being a local form of *Z. doubledaii*, Westwood. The latter was described from a female specimen from "India," and is somewhat roughly figured in the Genera of Diurn. Lep. on pl. lii, fig. 1. Distant figures both sexes and records it from Penang and Perak. Moore records it from Penang. I have compared both sexes from Perak with both sexes from Sumatra, and Sumatra females with Hewitson's original figure, and can discover no differences whatever. Herr Fruhstorfer has recently been to London and has probably compared his types of *Z. nicévillei* with the type of *Z. doubledaii*, so on his authority I maintain the species as distinct. In Sumatra *Z. nicévillei* is rather more common than *Z. amethystus*, Butler, and it occurs at Bekantschan and Selesseh in June and August, and even at Batang Serangan, still nearer the sea; also in Asahan. The female has the macular band on the upperside of the forewing violet-white.

105. * ZEUXIDIA LUXERII, Hübner.

Grose Smith as *Amathusia* [sic] *luxerii*. Only known to us from Java, where it is the commonest species in the genus.

106. ZEUXIDIA (*Amaxidia*) AURELIUS, Cramer.

Grose Smith as *Amathusia* [sic] *aurelius*. Staudinger. Kirby. Distant. This species was originally figured and described by Cramer from a female obtained on the west coast of Sumatra. Occurs from Selesseh to Bekantschan and even higher in May and September; is rarer than the other species of the genus. The female often measures six and a half inches across the wings, and is one of the largest-known *Rhopalocera* in total wing area. The female has the band on the upperside of the forewing white. All *Zeuxidias* are only met with in large high forest near small streams, on whose borders there are usually some bamboos, on the leaves of which most probably the larva feeds. They fly rapidly but settle often, but always in a dense mass of branches and stems of bushes, so that they are very difficult to secure. The best way to collect them is to place rotten plantain fruit (pisangs or bananas) along the streams they haunt, to which they will come. The males of all our *Zeuxidias* are true inhabitants of the forest, and exhibit rich blue colours on the upperside. When settled with closed wings their very great resemblance to dead leaves on the underside makes them very difficult to distinguish amongst the true dead leaves which always and at all seasons strew the forests in the tropics. In South-East Borneo (Bandjermassin) all species of *Zeuxidia* appear to be far commoner than they are in Sumatra, the Malay Peninsula and Burma. Out of 1,000 specimens of butterflies Dr. Martin received from thence, 200 were three species of *Zeuxidia*.

107. AMATHUXIDIA DILUCIDA, Honrath.

Occurs only in high forest in July, and is found up to the elevation of Bekantschan. Very rare, Dr. Martin obtained five specimens only in thirteen years; one pair from Aer Kesoongei in Asahan. It has the same habits as *Zeuxidia*, and is difficult to secure.

108. AMATHUSIA PHIDIPPUS, Johanssen.

Grose Smith. Snellen. Semper. Distant. Hagen. It sometimes does great damage to the beautiful green leaves of the young cocoa-nut palms, *Cocos nucifera*, Linnæus, on which the larva feeds, and which after some while present the appearance of ugly dried-up brushes. The larva also ate the leaves of other palms in Dr. Martin's garden at Bindjei, for instance the African oil palm and the common Palmyra or fan-leaf palm. The caterpillars live socially when young, but separate after changing their last skin. They are green with reddish-brown hairs. The larva of a large Skipper, *Hidari irava*, Moore, feeds at the same time on the leaves of *Cocos nucifera*, and the two species often have a severe struggle to live together, in which the more robust hesperid, which secures a shelter for itself by spinning the leaves together, is generally victorious. The pupa is uniform light green, and hangs perpendicularly on horizontal leaves. The butterfly appears most commonly in December and January, after which time only single specimens are seen. In the daytime it is only found in places where there is deep shade, it never ventures out into the open sunlight, but is most active after sunset, and like *Melanitis* comes sometimes to the lamps. In its prediliction for shade it often enters houses and sheds. It is a very variable species.

109. AMATHUSIA SCHOENBERGI, Honrath.

A. schönbergi, Honrath, Berl. Ent. Zeitsch., vol. xxxi, p. 347, pl. vi, fig. 1, *male* (1887).

This species was originally described from Tanyong Malim, Perak, Malay Peninsula. It appears to be a distinct species, while *A. ochraceofusca*, Honrath, and *A. phidippus*, var. *perakana*, Honrath, both from Perak, seem only to be varietal forms of *A. phidippus*, Johanssen. It is the *Amathusia* of the forest, as it occurs only in high forest from Selesseh to Bekantschan. As in the forests there are no cocoa-nut trees, that palm being nearly domesticated, *A. phidippus* does not occur there, but is replaced by the far finer and deeper-coloured *A. schoenbergi*. Dr. Martin's Javan collector Saki observed a female of this species depositing eggs on *Areca nibong*, which palm only grows in the forest, and there is not any doubt that the larva of *A. schoenbergi* feeds on this plant, round groups of which Dr. Martin always noticed the imagines flying. It is, however, a very rare species.

110. THAUMANTIS ODANA, Godart.

Grose Smith. Hagen as *klugius.* Staudinger. Distant. The commonest species of the genus in Sumatra, next to *T. lucipor*, Westwood; it is found from Bekantschan to Soengei Batoe, and is therefore the most alpine species of the genus.

111. THAUMANTIS (*Kringana*) NOUREDDIN, Westwood.

Occurs at the lowest elevations and nearest the sea of all the species in the genus, as nearly all specimens obtained by Dr. Martin came from Kampong Stabat, and were caught in forests on both sides of the Wampoe River. He also obtained one pair as far south as Asahan.

112. THAUMANTIS (*Kringana*) LUCIPOR, Westwood.

The commonest of the three Sumatran species of the genus. It appears as low down as Bindjei, and is found as high as Namoe Oekor. Dr. Martin caught his first specimen of this species, a female, in June, 1888, at 7-30 p. m., flying along the white walls of his hospital so that he could just distinguish it to be a butterfly. In this species the blue reflections of the male on the upperside of both wings are so richly brilliant and powerful that in opening the wings of a closed specimen the pinchers used are strongly coloured with blue like the wings. All *Thaumantides* are inhabitants of the high virgin forest. They all like shade, and are on the wing very late after sunset. All are fond of the ripe fallen fruit of the Sumatran sugar-palm (*Arenga saccharifera*) on which they regale themselves in the shadow of the tree. They rest with closed wings, and only display their rich blue coloration when on the wing.

113. *TENARIS BIRCHI, Distant.

Originally described from Singapore. Recently taken by Dr. Hagen in Maudaheling, a Malay state in Western Sumatra.

114. DISCOPHORA NECHO, Felder.

Hagen as *necho*, Felder, var. *cheops*, Felder. Staudinger as *cheops*. Semper as *cheops*. I described this species as *D. dis* (Journ. Bomb. Nat. Hist. Soc., vol. vii, p. 325, n. 3, pl. H, fig. 3, *male* (1892). *D. necho* is a common species, and is found also in Java and Borneo. Semper records *D. celinde*, Cramer [should be Stoll] as well as *D. necho* from Sumatra. As *D. celinde* was described from Java where *D. necho* also occurs undoubtedly, it may be that both *D. celinde* and *D. necho* occur also in Sumatra. *Amathusia phidippus*, Johanssen, is the commonest, and *D. necho* the next commonest species of the subfamily in Sumatra. The males are very fond of frequenting fæces on roads, from which they fly into the jungle when disturbed, but return again as soon as danger is past. The females are much rarer, and only fly in the evening after sunset and then only very high up in the air, so that they can hardly be distinguished from

Melanitis, *Amathusia* and *Thaumantis* flying at the same time. Only when they come down to rest, or to deposit their eggs are they caught. The larva feeds on different *Gramineæ*, Dr. Martin has found them even on the famous Lalang grass (*Imperata arundinacea*), and on the sugarcane (*Saccharum officinale*). The larvæ always keep in pairs, never more than two together; they rest with the head downwards, and eat the lower portions of the leaves on which they rest. The pupa is quite green, and is very similar to that of *A. phidippus*. *D. necho* is not found at a higher elevation than Bekantschan. It is probable that *D. necho*, Felder, *D. cheops*, Felder, and *D. dis*, de Nicéville, from Java, Borneo and Sumatra respectively, all represent a single species, of which the first-named is the oldest.

115. DISCOPHORA SONDAICA, Boisduval.

Hagen. Distant. Dr. Hagen records *D. tullia*, Cramèr, as well as this species from Sumatra, but according to Mr. Moore, *D. tullia* is confined to China, especially to Hongkong. In all Dr. Hagen records four species of *Discophora* from Sumatra; we know two only. It is found at lower elevations than *D. necho*, Felder, not much higher than Bindjei, where it is not uncommon near bamboo hedges. The females as usual in the genus are much rarer than the males. Dr. Martin obtained his first female from a pupa which he found near the manager's house of the Bekalla Estate under the roof of a small attap shed on the riverside near a thicket of bamboos. The female is much more beautiful than the same sex of *D. necho*, which has only a broad oblique yellow band across the forewing on the upperside.

116. ENISPE EUTHYMIUS, Doubleday.

Hagen as *eutymius* [sic]. Sumatran specimens resemble the dark form of this species found in Assam and Burma which has been named *E. tessellata* by Mr. Moore, but which is certainly not a distinct species, as it is found in some localities with, and grades imperceptibly into, the typical form. Its occurrence in Sumatra while apparently absent from the Malay Peninsula is an interesting fact in geographical distribution. It is everywhere rare, and in Sumatra is found only on the Central Plateau, and is occasionally brought in by the Battak collectors. Dr. Hagen states that he has always obtained this species together with *Limenitis bockii*, Moore, which is a curious coincidence.

117. CLEROME ARCESILAUS, Fabricius.

Grose Smith. Snellen. Hagen. Distant. The commonest species of the genus in Sumatra as elsewhere.

118. Clerome kirata, de Nicéville.

C. kirata, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. vi, p. 344, n. 2, pl. F, fig. 3, *male* (1891).

The rarest of the three Sumatran species of the genus, and found in the same localities as *C. arcesilaus*, Fabricius. I have no difficulty in distinguishing the species, though Colonel Swinhoe fails to recognise it, *vide* his remarks on *C. arcesilaus* in Trans. Ent. Soc. Lond., 1893, p. 276, n. 77. The male was chiefly defined by a difference in the prehensores, but the superior width of the dark bands on the underside of both wings, and the anal half of the hindwing being very much darker than the same area in *C. arcesilaus* will enable one to distinguish the species superficially without recourse to an anatomical investigation. The female has the ground-colour on the underside of both wings much lighter than in *C. arcesilaus*, and all the bands consequently more prominent; they are also much wider.

119. Clerome gracilis, Butler.

Hagen as *gracilis*. *C. gracilis* is met with somewhat higher than *C. arcesilaus*, Fabricius, and is also rarer than that species. All the species of *Clerome* are true insects of the virgin forest, never leave the ground for a high flight, and prefer to settle on the bare soil or on a dead and discoloured leaf than on living green leaves or shrubs. They rest with folded wings, and fly only for short distances, and then again settle. No species occurs at a higher elevation than Bekantschan, nor nearer the sea than Bindjei.

120. Xanthotænia busiris, Westwood.

Hagen. Grose Smith as *Clerome* [sic] *busiris*. Butler. Distant. Found from Bindjei to Bekantschan. Like *Clerome* it is a true inhabitant of the forest, but has a higher and longer flight than species of that genus and is not so easily caught, as it is always changing the direction of its flight. It is fond of newly cut ditches through the forest, along which it may always be found.

Subfamily Acræinæ.

121. Pareba vestita, de Nicéville, n. sp.

Acræa vesta, Snellen (*nec* Fabricius), Midden-Sumatra, Lepidoptera, p. 18, n. 1 pl. ii, figs. 3–5, *female* (1892).

Snellen as *terpsichore*, Linnæus [sic], and *vesta*. Hagen as *vesta*.

Habitat: N.-E. Sumatra.

Expanse: ♂, 2·0 to 2·5; ♀, 2·4 to 2·5 inches.

Description: Male and female. Upperside, both wings differ from *A. vesta*, Fabricius, from the Himalayas, Assam, Upper Burma and Java in having the ground-colour more ochreous (less tawny), and all the veins more heavily defined with black. *Forewing* has a broad costal black margin reaching the subcostal nervure; the outer margin has the black border nearly twice as broad, with the marginal series of spots of the ground-colour obsolete or entirely absent. *Hindwing* has the black margin much broader, with the yellow marginal spots very much smaller. UNDERSIDE, *both wings* differ only in having all the veins more strongly defined with black.

Occurs only on the Central Plateau, where it appears to swarm to the same extent as the allied species does in Sikhim and elsewhere. Dr. Martin has had the larva and pupa brought to him by his collectors. It flies all the year round, and there is often an over population, after which it becomes somewhat scarce for a while till it recovers itself and again becomes common.

Subfamily NYMPHALINÆ.

122. ERGOLIS ARIADNE, Linnæus.

Snellen. Wallace. Hagen. Distant. This species may be known from the one that follows by its richer brighter tawny coloration, by the outer margin of both wings being much more irregular, and in the male by the "male-mark" present on the underside of the forewing, which, in this species, is a solid shining deep black patch reaching from near the inner margin to the third median nervule. Its larva feeds on the stinging creeper, *Tragia involucrata*. The butterfly is only found in the forest from Bindjei to Bekantschan, and always near its food plant. It has a low flight, only males when fighting fly high in the air.

123. ERGOLIS ISÆUS, Wallace.

***E. isæus*, Wallace, Trans. Ent. Soc. Lond., 1869, p. 333, n. 4.**

Wallace. Kirby. Hagen, as *taprobana*. Distant. Nearly allied to but quite distinct from *E. merione*, Cramer. The outer margin of both wings is much more even and regular than in the preceding species, and the coloration is duller and darker. The "male-mark" is in a similar position, but is very inconspicuous and consists of a broad line of modified black scales extending along either side of the veins on the disc of the forewing on the underside, but not reaching the outer margin nor the costa. *E. merione* has a quite different "male-mark," which is similar to that in *E. ariadne*, Linnæus. I have specimens of *E. isæus* from Myitta in Burma and from Singapore; Wallace records it from Singapore also and Sumatra. The larva feeds on *Ricinus communis*, Linn., the castor-oil plant. Occurs everywhere in the plains and all the year round, mostly near the houses of Indian (Tamil) coolies, who are very fond of cultivating the castor-oil plant. Its flight is perhaps lower and weaker than that of *E. ariadne*, Linnæus. Dr. Hagen records *E. taprobana*, Westwood, from Sumatra, a species confined to South India and Ceylon as far as our experience goes. It is a very noticeable fact that everywhere two quite distinct species of *Ergolis* occur together.

124. **EURYTELA HORSFIELDII**, Boisduval.

Hagen. Grose Smith.

125. **EURYTELA CASTELNAUI**, Felder.

Snellen. Hagen. Grose Smith. Both the Sumatran species of this genus occur only in forests, and are somewhat rare insects, the female being the rarer sex of the two. *E. horsfieldii*, Boisduval, occurs more in the plains, from Bindjei to Namoe Oekor; *E. castelnaui* at higher elevations, from Namoe Oekor to Soengei Batoe. The females are splendid mimics of the two preceding species of *Ergolis*, *E. castelnaui* mimicking *E. isæus*, Wallace, and *E. horsfieldii* mimicking *E. ariadne*, Linnæus. Even in the way of flying they closely resemble the flight of species of *Ergolis*. Dr. Martin obtained his first female of *E. castelnaui* while catching *E. isæus* on the same spot in a forest south of Namoe Oekor. The males always settle with folded wings for greater protection, and have some predilection for the sandy banks of small streams running through the forest.

126. **EURIPUS HALITHERSES**, Doubleday and Hewitson.

Hagen as *halitherses* and *euplœoides*. Staudinger. The male differs from typical *E. halitherses* in having the marginal dots on both sides of the forewing restricted more to the anal angle. The female is trimorphic, in one form the ground-colour is brown as in typical *E. euplœoides*, Felder; in the second form it is indigo-blue; in the third form it is blue without white patches on both wings and mimics *Euplœa linnæi*, Moore. The first two forms seem to be mimics of *Euplœa diocletianus*, Fabricius. As usual, the amount of white coloration on the wings in the female is very variable, and on that character no species should be based. One of these inconstant forms has recently been described by Mr. Distant as *E. borneënsis*, and seems to be intermediate between *E. euplœoides* and *E. pfeifferæ*, both of Felder, from the Malay Peninsula. This species was, before the forests of Deli and Langkat fell victims to the triumphal march of the tobacco cultivation, a fairly common insect, of which the males often escaped capture by being mistaken for a still commoner species of *Athyma*. Even now on the frontiers of tobacco-land, as at Selesseh, *E. halitherses* is not rare, only the females are scarce. The males have a strong short flight like species of *Athyma*, whereas the females on the wing mimic different species of *Euplœa*, having a slow and sailing motion. Dr. Martin possesses a single male almost without white markings on the upperside of the forewing, which for a long time he thought represented a second species, but as he never obtained a second specimen, it is probably an aberration. *E. halitherses* extends from Bindjei to Bekantschan, and is found only in forests.

127. Cupha erymanthis, Drury.

Snellen. Hagen. Occurs everywhere all the year round in ever following generations. Wherever a small piece of forest has been spared, there this is one of the first *Rhopalocera* to be found. It is very fond of flowers, but is shy, and has a restless flight.

128. Atella sinha, Kollar.

Snellen as *egista*. Hagen as *egista*. Grose Smith. Wallace. Distant. I have never seen *A. egista*, Cramer, which was described from Amboina, and recorded from Amboina, Bouru, Batchian, Morty, and New Guinea by Dr. A. R. Wallace. *A. sinha* is the rarest of the *Atellas* occurring in Sumatra, is found both in the plains and hills, has a very quick flight, and is not easily captured except when settled on a flower or on a moist spot on a forest road where it can be "potted" with the net.

129. Atella phalantha, Drury.

Snellen. Hagen as *phalanta* [sic], Horsfield and Moore [sic]. Distant as *phalanta* [sic]. Occurs only at low elevations, often very near to the sea, frequents flowers, and is not easily caught from its shy restless habits and quick flight. It is very common throughout the year.

130. Atella alcippe, Cramer.

Snellen. Hagen. Grose Smith as *aruana* [sic]. The *A. arruana* of Felder, from the Aru Isles (*Felder*), Mysol (*Wallace*), is a local race of *A. alcippe*. Found in Sumatra at higher elevations than the two foregoing species, even as high or higher than Bekantschan. Never seen in Deli, and never on black soil which is so favourable for tobacco, but as soon as there is red soil, as in Langkat and Serdang, one may be sure to meet *A. alcippe* on damp places in forest roads. It is very common near Selesseh.

131. CETHOSIA HYPSINA, Felder.

Snellen as *penthesilea* and *cyane.* Grose Smith as *hypsea.* Hagen as *cyane.* Wallace. The *C. penthesilea* of Cramer appears to be a distinct species, and occurs in Java. The *C. hypsea* of Doubleday and Hewitson is the Bornean form. *C. cyane*, Drury, is the Indian form.

132. CETHOSIA CAROLINÆ, Forbes.

C. carolinæ, Forbes, A Naturalist's Wanderings, p. 274 (1885).

A local race of *C. methypsea*, Butler, of the Malay Peninsula.

133. CETHOSIA LOGANI, Distant.

Hagen as *logani* and *biblis.* May perhaps be a local race of *C. biblis*, Drury, but in the Malay Peninsula both occur together. It may be noted that Dr. Hagen records both in one paper from Sumatra, so both may be found there also. *C. hypsina* and *C. logani* occur at low elevations, the latter even close to the sea—Dr. Martin once found many larvæ near the Saentis Estate only two miles distant from the sea—whereas *C. carolinæ* appears at the elevation of Bindjei, and from thence to the Central Plateau, those from high elevations being very richly coloured. All species of *Cethosia* are forest butterflies, frequenting both large and small jungle. The always sombre dark green forest is often made of a gayer aspect by the presence of these numerous, vivid, and gorgeously-coloured butterflies. Their flight resembles that of the *Danainæ* and is slow and sailing. The larvæ of *C. hypsina* and *C. logani* live on *Passiflora* sp., and eat not only the leaves but also the soft shoots of this creeper. The larva of *C. logani* is yellow with black longitudinal stripes, of *C. hypsina* of a very rich deep scarlet, broken only on the two median segments, which are creamy-white. Both larvæ have composite spines, they live in societies, and are always found in large numbers. On one occasion when Dr. Martin was collecting the larvæ of *C. hypsina* on a Passion-Flower with red fruit, he noticed the protective position assumed by some of the caterpillars which in eating a twig had surrounded it entirely, so that this bunch of larvæ even at a short distance looked like one of the fruits. In breeding a large number of *C. hypsina*, Dr. Martin noticed that the males emerged from the pupæ one day earlier than the females. None of the Sumatran species of *Cethosia* are dimorphic in the female, and none of them have dark females as have the species from India, Ceylon, and Nias.

134. TERINOS ATLITA, Fabricius.

Snellen. Grose Smith. Kirby. Hagen as *teuthras*, var. *delianus*, so named, but not described, in Dr. O. Staudinger's sale list No. xxxiii (1889). Wallace as *viola.* Wallace described *T. viola* from Singapore and Sumatra, but pointed out that the male he described from Sumatra differed somewhat from his specimen from Singapore. The latter equals *T. teuthras*, Hewitson, *teste* Distant, the former *T. atlita.*

135. TERINOS CLARISSA, Boisduval.

Snellen as *larissa* [sic], Boisduval.

136. TERINOS TEOS, de Nicéville.

T. teos, de Nicéville, Journ. Bomb. Nat. Hist. Soc, vol viii, p. 41, n. 4, pl. K, figs. 5, *male*; 6, *female* (1893).

Grose Smith as *robertsia*. Snellen as *robertsii* [sic]. Hagen as *robertsia*, var. ? *sumatrana*, so named, but not described, in Dr. O. Staudinger's sale list No. xxxiii (1889) as var. *sumatrensis*. Wallace as *robertsia*, local form A. This species is a local race of *T. robertsia*, Butler, from the Malay Peninsula. Without knowing the habits of the species of the genus *Terinos*, one would know from their rich violet-blue coloration that one has to deal with true inhabitants of large forests, which never go to small jungle as the foregoing *Cethosiæ* often do. *T. clarissa*, Boisduval, is very rare, and no exact locality for it can be given except one specimen from Bekantschan, as all the specimens procured were brought in with numerous specimens of *T. teos*, de Nicéville, Dr. Martin not noticing the difference between these two species till I pointed it out to him. *T. atlita*, Fabricius, occurs more in the plains, but not at a lower elevation than Bindjei and Selesseh, but does not extend higher than Namoe Oekor. *T. teos*, de Nicéville, commences to appear at the same places and is found as high as Bekantschan and the lower hills. The butterflies are very restless, and fly round certain trees, on which they rest for a moment and then fly off again, so are not easy to catch, besides which they usually settle high up and fly high too. In November and December both the common species appear in large numbers, while in all the other months they are only procured singly, and are very worn, so Dr. Martin thinks that they may be only single brooded. At Namoe Oekor in October Dr. Martin and I caught only worn females, males being entirely absent, and in December of the same year the collectors brought in many males and a few fresh females from the same spot. Otherwise females are always rarer than the males, especially that sex of *T. atlita*. The female of *T. clarissa* is unknown to us from Sumatra. No Sumatran species of the genus shew the beautiful whitish-violet patch on the upperside of the hindwing found in *T. teuthras*, Hewitson, and *T. robertsia*, Butler, from the Malay Peninsula.

137. CYNTHIA EROTOÏDES, de Nicéville, n. sp.

C. deione, Distant (*nec* Erichson), Rhop. Malay., p. 184, n. 1, pl. x, figs. 1, *male*; 2, *female* (1883).

Snellen as *arsinoë*. Hagen as *arsinoë*. Staudinger as *arsinoë*. Kirby as *arsinoë*. Distant as *deione*.

HABITAT: Malay Peninsula, N.-E. Sumatra, Borneo.

EXPANSE: ♂, 2·9 to 3·2; ♀, 3·7 to 4·0 inches.

DESCRIPTION: MALE. UPPERSIDE, *both wings* differ from *C. erota*, Fabricius, from the Eastern Himalayas, Bhutan, Assam, Burma, and Java in their darker ground-colour. *Forewing* differs in the apex being widely and the outer margin decreasingly infuscated. Otherwise as in that species. FEMALE. UPPERSIDE, *hindwing* differs only in having the inner of the two submarginal fuscous lines straighter—less lunulated—and continuous. Otherwise as in that species.

Cramer described *C. arsinoë* from Amboina and the west coast of Sumatra, but apparently figured it (a male) from the former locality, my specimens from Saparua in the Moluccas and from New Guinea agreeing fairly well with Cramer's figure. *C. dejone*, Erichson, was described from Luçon in the Philippines, the female being figured. In the male of this species the apex of the forewing on the upperside is not infuscated, and in the female the ocelli of the hindwing on the upperside differ in being almost entirely ochreous, with a very small instead of a large black centre. *C. cantori*, Distant, described from a unique specimen from Province Wellesley, is probably a "sport." The males of *C. erotoides* are common everywhere in Sumatra, and are found all the year round on forest roads, where they are fond of moist spots, to which they will always return even after an attempt is made to catch them. The females are as rare as the males are common, and are only found in the forest. The males have a strong short flight, somewhat like that of a *Charaxes*, whereas the females fly more slowly and sail more. The species is found only as high as Bekantschan.

138. CYNTHIA BATTAKA, Martin.

C. battaka, Martin, Nat. Tijd. voor Neder.-Indië, vol. liii, p. 338, n. 3 (1893).

This species may typically be known from *C. erotoides*, de Nicéville, by its smaller size, darker ground-colour of the upperside, the apex of the forewing especially being much more infuscated, the basal area of both wings on the underside is of a deeper red, and the subapical spot in the upper discoidal interspace of the forewing is always silvery-white, while in *E. erotoides* it is either totally wanting, or, if present, is small and fuscous; the tail to the hindwing is also shorter. From Bekantschan to the higher hills and the Central Plateau *C. battaka* alone occurs, and it has the same habits as *C. erotoides*. As Dr. Martin never obtained the latter species from places higher than Bekantschan, and never true *C. battaka* from places lower than Bekantschan, and as both species occur quite at the same time, there can be no question here of seasonal dimorphism. Dr. Martin notes that he is quite sure *C. battaka* is a good species restricted to the mountainous regions of our area. He notes also that he has received some specimens of *C. battaka* from Java, but without exact locality, and hopes to hear later at what elevation they were obtained, as *C. erotoides* occurs also in that island. Dr. Martin further notes that he obtained one female of *C. battaka*, which differs greatly from the female of the former species; these differences are pointed out in his original description of *C. battaka* (l. c.).

139. APATURA NAMOUNA, Doubleday.

Hitherto this species has not been recorded south of Upper Burma, its re-appearance in Sumatra is most interesting. In our area it is a very rare butterfly, and is found only on the higher hills at an elevation of not less than 3,000 feet, and from the Central Plateau and the Gayoe mountains. The specimens from Sumatra are decidedly smaller than those from Northern India, but do not otherwise differ. No female from Sumatra has been obtained.

140. *APATURA PARVATA, Moore.

Grose Smith. This is almost certainly a wrong identification, *A. parvata* being restricted to Sikhim and Bhutan. The specimen Mr. Grose Smith obtained was probably a female of the next species.

141. APATURA (*Rohana*) SUMATRENSIS, Staudinger.

A. (*Rohana*) *parisatis*, Westwood, var. *sumatrensis*, Staudinger, Iris, vol. ii, p. 80 (1889).

A. parisatis, Snellen (*nec* Westwood), Midden-Sumatra, Lepidoptera, p. 19, n. 1, pl. iii, figs. 1, *male*; 2, *male underside* × 2 (1892).

Snellen as *parisatis*. Hagen as *parisatis*. Staudinger as *parisatis*, and *parisatis*, var. *sumatrensis*. Semper as *camiba*. The male may be known from the N.-E. Indian and Burmese species, *A. parysatis*, Westwood, by having a small diffused apical ferruginous patch on the upperside of the forewing, which is absent from the continental species. The females of the two species differ but slightly. Like *Atella alcippe*, Cramer, this insect only appears on red soil (probably the food-plant of the larva grows only on that soil), where the males from Selesseh to the higher hills are not rare, whereas the females are always scarce, or apparently so, as they are excellent mimics of species of *Ergolis*, and are doubtless often passed over as such by the collectors. The males like to go to small muddy or swampy spots on the roads, where they are easily "potted" with a net. The females are never seen on the roads, but fly like *Ergolis* through the jungle. The male of this butterfly does not exhibit any very gorgeous coloration, but nevertheless it has a beauty of its own owing to the deep velvety-black colour of the upperside, which is so exceedingly delicate and so like the bloom on a peach that one never sees an absolutely perfect specimen in a collection. It is especially common on roads cut through the red hills on the banks of the Whampoe river, also in Serdang and Padang Bedagei.

142. APATURA (*Rohana*) ARTAXES, de Nicéville.

A. (Rohana) artaxes, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. ix, p. 261, n. 3, pl. N, figs. 3, *male*; 4, *female* (1895).

This species is restricted to the Central Plateau, from whence Dr. Martin obtained his first female specimens in October and December, 1893. As the males are very similar to the same sex of the foregoing species, they escape the nets of the Battak collectors, and Dr. Martin only obtained two in thirteen years. Many more females than males have been obtained. It would be interesting to know if the female is a mimicker, and if so, what species is mimicked.

143. EULACURA OSTERIA, Westwood.

Staudinger. Rare in Sumatra, and occurs only at Selesseh and Namoe Oekor in July. The female is rather rarer than the male. Both sexes settle on the underside of leaves with wide-spread wings, and never fly long distances. It is a common butterfly in the Botanical Gardens at Singapore.

144. HESTINA NAMA, Doubleday.

Hagen as *nama*, Boisduval [sic]. Staudinger. Occurs in Perak in the Malay Peninsula.

145. HESTINA CAROLINÆ, Snellen.

H. carolinæ, Snellen, Tijd. voor Ent., vol. xxxiii, p. 218 (1890); idem, id., l.c., vol. xxxvii, p. 67 (1890).

Snellen. Both species of *Hestina* occur in our area only in the hills and on the Central Plateau, the lowest elevation at which they are found (except one male of *H. carolinæ* which Dr. Martin caught near the iron bridge over the Bindjei river at Namoe Oekor) being Bekantschan. *H. carolinæ* flies in May. *H. nama* doubtless mimics *Danais* *tytioides*, de Nicéville, while *H. carolinæ* mimics *Danais banksii*, Moore. So long as these *Hestinas* think themselves safe and unobserved their flight closely resembles that of the *Danainæ*, but as soon as they scent danger they assume their proper rapid mode of flight, which is like that of the males of species of *Hypolimnas*. So far females of *H. carolinæ* have only been obtained, that sex of *H. nama* not having been captured in our area. The two species are undoubtedly distinct, the differences between them being well pointed out by Heer P. C. T. Snellen. They are very much rarer than is *H. nama* in the Himalayas.

146. HERONA SUMATRANA, Moore.

H. sumatrana, Moore, Trans. Ent. Soc. Lond., 1881, p. 308; id., de Nicéville, Journ. A. S. B., vol. lxiii, pt. 2, p. 5, n. 4, pl. iii, fig. 7, *female* (1894).

Moore. Grose Smith. Originally described from Sumatra. As also in all other localities the Sumatran species of *Herona* is very rare. In Deli it occurs from Selesseh to Bekantschan in March, July and September, but only four or five specimens a year will be obtained by all our collectors put together. On the wing it looks like an *Euthalia* and has a similar flight, though it has the habit of settling on tree trunks which *Euthalias* seldom or never do except when sucking up the juice from a wound in the bark.

147. PRECIS IPHITA, Cramer.

Snellen. Hagen.

148. PRECIS IDA, Cramer.

Hagen. Semper. Both species of *Precis* are found throughout our area and all the year round in ever following generations. *P. iphita*, Cramer, is somewhat the rarer, and is restricted to forests both large and small, whereas *P. ida* is found more in open ground, mostly near houses, in gardens, and in orchards, but never in forest. There are no intermediate gradations between these two species in Deli. They have a stronger and bolder flight than the species of *Junonia* which follow.

149. JUNONIA ALMANA, Linnæus.

Snellen as *asterie*. Grose Smith as *asterie*. Hagen as *asterie*. Distant as *asterie*. In my opinion *J. almana* and *J. asterie*, both of Linnæus, are one and the same species, the former being the dry-season non-ocellated, the latter the wet-season ocellated form. Only the latter is found in Sumatra, which accounts for that name being used by all authors in recording it from the island. As, however, *almana* is the older name for the species, it has to be used, though it was applied to the dry-season form. It is common in Sumatra on open grassy places, near houses and ditches, but is never found in the forest. Dr. Martin once found the larva on a small, low, white-flowering, labiate plant.

150. JUNONIA ATLITES, Linnæus.

Snellen as *laomedia.* Hagen as *laomedia.* Distant. Quite as common in Deli as the preceding species, and found from close to the sea to the Central Plateau, specimens from the hills being richer in colour with blacker margins than those from the plains. It is very fond of water, near which, if it is running in open places or in ditches, it may always be found.

151. *JUNONIA VELLIDA, Fabricius.

Grose Smith. Kirby. This species occurs only in Australia, as far as I am able to ascertain. Its record from Sumatra by the authors cited is probably erroneous.

152. JUNONIA OCYALE, Hübner.

Snellen as *orythia* [sic] and *orithyia.* Hagen as *orithya* [sic]. Semper. Staudinger as *wallacei.* *J. ocyale* is a local race of *J. orithyia,* Linnæus, a very widely spread and variable species. I agree with Herr Georg Semper (Schmett. Philipp., p. 120, n. 142) that *J. wallacei,* Distant, described from the Malay Peninsula and Java, is a synonym of *J. ocyale.* Mr Distant does not venture to say how the two species are supposed to differ. Even in a restricted area like Sumatra this butterfly shows variations within certain limits, and is more pronounced in the female than in the male. It is found over the whole of our area, but not too near the sea; it is very fond of small grassy spots, where it often abounds, and where also the rarer female may be captured. It is very restless, often settling, but only remaining for a very short time when it again takes a short quick flight, so that it is not easily caught. Dr. Hagen reports seeing it in large numbers in the short degenerated lalang-grass of the Central Plateau.

153. NEPTIS (*Rahinda*) HORDONIA, Stoll.

Grose Smith as *hordona* [sic]. Hagen. Distant.

154. NEPTIS (*Rahinda*) PARAKA, Butler.

Grose Smith as *peraka* [sic]. Hagen as *peraka* [sic]. Staudinger as *peraka* [sic]. Dr. Staudinger considers the *N. dahana,* Kheil, from Nias island, to be a synonym of this species.

155. NEPTIS TIGA, Moore.

Butler. Staudinger as *tiga* and *dorelia.* I have a very long suite of specimens of this species, and after careful comparison have come to the conclusion that *N. dorelia*, Butler (1877), *N. sattanga*, Moore (1881), and *N. kuhasa*, de Nicéville (1886), are all synonyms of *N. tiga*, Moore (1858). To this list will probably have to be added *Rahinda* [sic] *siaka*, Moore, Trans. Ent. Soc. Lond., 1881, p. 311, described from Sumatra, as the description agrees exactly with some specimens of *N. tiga* I possess from Perak in the Malay Peninsula and Sumatra. The variation observable in *N. tiga* is obviously mainly due to season, the dry-season form being sparsely banded with black on the underside, the wet-season form heavily so. Of the three small yellow *Neptes*, *N. hordonia* is the commonest, whereas *N. paraka* and *N. tiga* are both rare, especially the latter. They all occur in large and high forest, but are most frequently found on the boundaries of the forest, or just within the borders, where there is considerable sunshine. They are very weak-flying insects, and are easily captured when at rest with wide spread wings on the leaves of low bushes and on flowers. *N. hordonia* occurs in the plains up to Bekantschan, the other two prefer higher elevations, and have been caught as high as Soengei Batoe.

156. NEPTIS BATARA, Moore.

N. batara, Moore, Trans. Ent. Soc. Lond., 1881, p. 310.

Moore. Snellen as *miah.* Originally described from Sumatra. *N. batara* has been described and figured by Distant in Rhop. Malay., p. 444, n. 13, pl. xli, fig. 14 (1886), as *N. miah*, var, from Perak. It is very doubtfully distinct from *N. miah*, Moore. Found only on the higher hills at Soengei Batoe and the Central Plateau in July, but is very rare.

157. NEPTIS SANKARA, Kollar.

Excessively rare, Dr. Martin obtained a single male from the Battak mountains in October, 1894. It is more intensely black and white than typical *N. sankara*, but the markings are similar. The *N. amba* and *N. carticoides*, both of Moore, are synonyms of this species, as probably also is *N. amboides*, Moore.

158. NEPTIS THAMALA, Moore.

N. thamala, Moore, Journ. Linn. Soc. Lond., Zoology, vol. xxi, p. 36, pl. iii, fig. 1, *female* (1886).

Originally described from Lower Burma. It is very rare in Sumatra, Dr. Martin has obtained three or four specimens only, one of which from Namoe Oekor is in my collection, taken in October.

159. NEPTIS VIKASI, Horsfield.

Hagen as *vikasi*, Moore [sic]. Butler. Staudinger. A common species in the plains, but restricted to forest.

160. *NEPTIS OMERODA, Moore.

N omeroda, Moore, Proc. Zool. Soc. Lond., 1874, p. 571.

Grose Smith as *ormeroda* [sic]. Originally described from Penang in the Malay Peninsula. Mr. Distant considers it to be a synonym of *N. vikasi*, Horsfield. Mr. Moore describes it as being "a much blacker insect both above and below" than that species. It is unknown to us.

161. *NEPTIS HARITA, Moore.

Staudinger. It is quite probable that this species does occur in Sumatra, though Dr. Martin has never obtained it. Though quite distinct it may easily be overlooked, as it is very similar to *N. vikasi*, Horsfield.

162. NEPTIS ANJANA, Moore.

Is by far the most beautiful *Neptis* of our area, especially the underside of both wings, which exhibit very splendid colours. Is found only in the hills as high or even higher than the Central Plateau, 3,000 feet. Dr. Martin possesses three specimens only, the first obtained in 1894, after twelve years' collecting.

163. NEPTIS LEUCOTHOE, Cramer.

Snellen as *aceris*. Hagen as *aceris*. Certainly the commonest species of the genus in Sumatra, and found almost everywhere all the year round. *N. aceris*, Lepechin, of Europe, appears to me to be distinct from the present species, as it has the white bands on the underside of both wings not outwardly defined with black as they invariably are in both the wet- and dry-season forms of *N. leucothoë*—the latter form not found in Sumatra.

164. *NEPTIS PAPAJA, Moore.

N. papaja, Moore, Proc. Zool. Soc. Lond., 1874, p. 570.

Moore. Kirby. The description of this species agrees with specimens I have identified as *N. leucothoë*, Cramer, the ground-colour of the underside being "ferruginous-yellow; markings prominent, black-bordered." It was described from Sumatra. This adds one more to the twelve synonyms of *N. leucothoë* given by me in "The Gazetteer of Sikhim," p. 137 (1894).

165. **NEPTIS NATA**, Moore.

Grose Smith. Hagen. A common species in the plains. It is a little variable, in typical specimens the discal white band on the underside of the hindwing ends on the costal nervure, in others it ends on the first subcostal nervule. I greatly doubt if the *N. gononata*, Butler, from Malacca, is distinct from this species.

166. **NEPTIS DURYODANA**, Moore.

Grose Smith as *duryodama* [sic]. Snellen. A common species of the plains in October.

167. ***NEPTIS NADINA**, Moore.

Grose Smith as *soma*. *N. soma*, Moore, is a synonym of *N. nadina*, Moore. It is probable that Mr. Grose Smith identified this species from specimens similar to those which I subsequently described as *N. clinioides*.

168. **NEPTIS CLINIOIDES**, de Nicéville.

N. clinioides, de Nicéville, Journ. A. S. B., vol. lxiii, pt. 2, p. 6, n. 5, pl. i, fig. 8, *male* (1894).

Very rare, a few specimens only have been obtained in the Battak mountains and Central Plateau in June.

169. **NEPTIS SUSRUTA**, Moore.

Grose Smith. A common species in the low forests.

170. ***NEPTIS HELIODORA**, Cramer.

Hagen. Probably a wrong identification. It was described from Amboina, and is apparently confined to the Moluccas.

171. **NEPTIS OPHIANA**, Moore.

Hagen as *ophiana*, var.? Very rare, Dr. Martin has obtained a single specimen. Herr Georg Semper places this species and its allies in the genus *Phædyma*, Felder, of which *N. heliodora*, Cramer, is the type (Schmett. Philipp., p. 142 (1889). With the exception of *N. sankara*, Kollar, *N. clinioides*, de Nicéville, and *N. ophiana*, Moore, all the black species of *Neptis* are common insects, occurring everywhere in open places, both in small jungle and in large forest, except *N. susruta*, Moore, and *N. nata*, Moore, which are restricted to the latter. Of the *Nymphalinæ* the species of this genus are earliest on the wing, and do not appear at all to mind the leaves being wetted with rain or dew. After a shower they will appear immediately, and even fly when there is no sun. Wherever there are a few trees or bushes along the roads, in gardens, and in fact practically everywhere they may be found, weakly sailing about and frequently settling; apparently highly protected as they shew no fear whatever.

172. CIRRHOCHROA ORISSA, Felder.

Grose Smith. Hagen. In the male on the upperside of the forewing the first median nervule and submedian nervure, and the subcostal nervules of the hindwing are for some distance on both sides defined by a fine ochreous line, the veins themselves being black. Occurs only in forest, but not at high elevations, not higher than Namoe Oekor; very common at Selosseh in June and August.

173. CIRRHOCHROA SATELLITA, Butler.

Hagen. The male has no secondary sexual characters. It is rarer than *C. orissa*, Felder; occurs only in forests, and at still lower elevations in July. It is weaker on the wing than that species.

174. CIRRHOCHROA CLAGIA, Godart.

Snellen. Distant. In the male on the upperside of both wings the veins where they cross the disc are more or less black, and in the forewing they are defined on both sides with ochreous for a short distance on entering the broad black marginal border. Occurs only at elevations over 1,000 feet, higher than Namoe Oekor, found at Bekantschan and Soengei Batoe in May, July, and September. Is the rarest of all the species of *Cirrhochroa* occurring in Sumatra.

175. CIRRHOCHROA BAJADETA, Moore.

Snellen. Hagen. The male has no secondary sexual characters. Is found everywhere in October in forest, and also in places where a small piece of the original forest has been left, as does *Cupha erymanthis*, Drury. The males are prone to visit damp spots on roads.

176. CIRRHOCHROA MALAYA, Felder.

Hagen. Wallace. Mr. Distant remarks that "Specimens will be obtained of a completely intermediate character between *C. bajadeta* and *C. malaya*." I have seen none such in Sumatra, in fact, *C. malaya* appears to me more nearly allied to *C. mithila*, Moore, than to

C. bajadeta, the male differing from that sex of the former on the upperside of the forewing in having a broad black marginal border instead of three waved black lines, and in the hindwing in having the inner of the three marginal black lines discontinuous instead of continuous. The secondary sexual characters of the male consists in some specimens (absent in others) of the fifth subcostal and upper discoidal nervules of the forewing on the upperside on entering the apical black margin being defined on both sides by a narrow line of ochreous. It is much rarer than *C. bajadeta*, and occurs in the same localities, but is not found higher than Namoe Oekor. The female is unknown to us.

177. CIRRHOCHROA MITHILA, Moore.

Hagen as *aoris*. *C. aoris*, Doubleday and Hewitson, is confined to the Eastern Himalayas, Assam, and Upper Burma, Dr. Hagen's identification probably applies to the present species. It is somewhat rare, and found in forests at low elevations. The male has no secondary sexual characters.

178. CIRRHOCHROA (*Paduca*) FASCIATA, Felder.

Wallace. Staudinger. Kirby. Semper. I have fully described the male secondary sexual characters of this species in Butt. of India, vol. ii, p. 109. It is the smallest and weakest-flying species in the genus, inhabits forest, and is always somewhat rare. It is found from near the sea to the mountains as high as Bekantschan. In 1890 Dr. Martin found it unusually plentiful at the Saentis Estate near the sea, where a flowering tree was daily covered, so long as the flowers lasted, with this species, and on two occasions he captured more than forty quite fresh specimens.

179. STIBOCHIONA KANNEGIETERI, Fruhstorfer.

S. kannegieteri, Fruhstorfer, Ent. Nach., vol. xx, p. 305 (1894).

Snellen as *coresia*. Grose Smith as *coresia*. Hagen as *coresia*. Staudinger as *coresia*. Kirby as *coresia*. Originally described from Sumatra and Borneo. Very near to *S. coresia*, Hübner, from Java, (from whence also Herr H. Fruhstorfer has described *S. rothschildi*), that species in the male on the upperside of the hindwing having a series of submarginal white spots which are absent in the Sumatran species, and in the female having a broad white marginal band which in the Sumatran species is replaced by a series of white spots similar to the male of *S. coresia*. Occurs in our area from the lower hills to the Central Plateau, is not common, and is seldom procured in perfect condition. The lowest localities where Dr. Martin has caught it are Namoe Oekor in Langkat, and Kotta Lembaroe in Deli. It settles on trees not very high from the ground with widespread wings, and behaves on the wing like an *Euthalia*.

180. HYPOLIMNAS BOLINA, Linnæus.

Snellen. Hagen as *bolina* and *jacintha*. Wallace. Staudinger as *bolina*, var. *jacintha*. Distant. Extremely variable in the female sex, many of them being of the form named *jacintha* by Drury. But none of the forms described by Cramer from Java which are more or less richly marked with ochreous on the upperside, such as *iphigenia*, *melita*, *alcmene*, *antigone*, and *proserpina* are found in Sumatra. In Deli it is rather rare, and prefers low elevations, not being found higher than Namoe Oekor. It is more plentiful near the sea, as at the Saentis Estate and at Mabar Dr. Martin could obtain one or two specimens nearly every day. Only in December, 1892, and January, 1893, it appeared in large numbers and all varieties of the female near Bindjei, but in the following year there was not a single specimen to be seen. It does not frequent forests, but is found on roads, in gardens, and near houses.

181. HYPOLIMNAS ANOMALA, Wallace.

Grose Smith. Snellen as *antilope*. Hagen. Semper. The *H. antilope* of Cramer described from Amboina appears to be a distinct species, and is recorded by Wallace from Amboyna, Ceram, and Bouru. In our area *H. anomala* becomes year by year more scarce, in correlation with the disappearance of the forests. It does not occur at higher elevations than Bindjei. Is a highly mimetic insect, as the males very closely resemble on the wing the brown species of *Euplœa*, such as *E. moorei*, Butler, and also settle near forest roads like *Euplœas* with *folded* wings. The female is trimorphic; the first form has the upperside richly glossed with blue, and mimics the male of *Euplœa linnæi*, Moore; the second form is dull brown, lacking the blue coloration altogether, is very similar to the male, only duller and larger, and mimics the brown *Euplœas*; the third form has along the outer margin of the hindwing on both the upper and undersides a series of marginal white streaks between the veins, and may be taken on the wing for *E. pinwillii*, Butler.

182. HYPOLIMNAS MISIPPUS, Linnæus.

Snellen. Hagen. Distant. The female in Sumatra is of the form of *diocippus*, Cramer, and is a beautiful mimic of *Danais chrysippus*, Linnæus. The form which mimics *Danais klugii*, Butler, and occurs in India and Africa, is not found in Sumatra, neither does it mimic the white aberration of *D. chrysippus*, (*alcippus*, Cramer), which is found in Sumatra, as it does in Africa. *H. misippus* is very common in Sumatra, and abounds in open places, on roads, near houses, and especially in newly-cut tobacco fields, where after the tobacco is cut down and removed there springs up a rich growth of low plants. Not found at a greater elevation than Bekantschan. Has a wide range, from Northern Australia and New Guinea on the one hand, to Florida in the United States of America on the other. Dr. Martin notes that not knowing the species in Europe and on first arrival in Sumatra he would not believe his European assistant when he brought both sexes and said they were male and female of one species. Dr. Martin dismissed him with an incredulous smile, but the next day he caught a couple paired, and then knew better.

183. ARGYNNIS NIPHE, Linnæus.

Snellen. Grose Smith. Hagen. Staudinger. Semper. Occurs only on the Central Plateau, where in some years it is found in large numbers and where Dr. Hagen captured it. Dr. Martin caught a single male specimen at Toentoengan in Deli in September, 1888, to which place this mountaineer may have been carried by a high wind. Sumatran specimens are never as large as those from Northern India, but are usually larger than the Javan form (*A. javanica*, Oberthür), which has a richer and darker coloration than the Sumatran form. The female is rarer than the male, native collectors bring it in the proportion of one to five. (For notes on this species see de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. viii, p. 153 (1893).

184. DICHORRHAGIA NESIMACHUS, Boisduval.

Hagen. Semper. Formerly by no means a rare insect in Deli and Langhat before the clearing of the forest, and occurred at low elevations, not higher than Bekantschan. Dr. Hagen before 1882 found it common in Serdang, whereas Dr. Martin, who commenced to collect in that year, obtained his first specimen in 1887 near a small river at Soengei Beras, where a small piece of forest was left. Later it was found to be more plentiful at Selesseh, also south of Namoe Oekor, and in Padang Bedagei; the Gayoe collectors again brought it in large numbers, collected in the forests on the way to their homes in the mountains. It is fond of settling on forest roads with wings only half open, and has a very rapid flight as its robust structure shews.

185. PARTHENOS GAMBRISIUS, Fabricius.

Hagen. Wallace. All the species of this genus have a very beautiful and characteristic flight, unlike any other butterfly known to me.

It is very strong on the wing, and flies over high bushes and trees, and alights on the uppersides of the leaves with open wide-spread wings. When flying it keeps the wings very level and parallel with the ground, the tips or apices of the forewings slightly depressed, it flaps the wings but seldom, and is much given to soaring. The Sumatran form is the one which has been named *P. lilacinus* by Butler, and has a patch on the internal area of the forewing and the basal area of the hindwing on the upperside marked with lilac. In our area it occurs all the year round at low elevations, not as high as Namoe Oekor, is not rare, but is not easy to capture. Is found not only in high forest, but also in small strips of forest and jungle always accompanying the smaller streams. Is very fond of and is only found near water. In a boat journey up the Bedagei River, both banks of which were covered with the flowers of a snow-white lily, Dr. Martin noticed *P. gambrisius* settling in considerable numbers on the flowers; a beautiful sight for a lover of nature. At the Batoe Mandi Estate on the high bank of the Wampoe River are planted a few male papaya trees (which of course bear only flowers and no fruit), and on these flowers the Javan collector Saki captured a very fine series of specimens.

186. LEBADEA MARTHA, Fabricius.

Limenitis martha, Butler, Cat. Fab. Lep. B. M., p. 59, n. 1, pl. i, fig. 4, *male* (1869).

Lebadea alankara, Horsfield (*martha*, Fabricius ?), var. *sumatrensis*, Staudinger, Ex. Schmett., p. 142 (1886).

Hagen. Butler as *alankara* and *martha*. Kirby. Distant. Staudinger as *alankara*, var. *sumatrensis*, and *martha*, var, *sumatrensis*. Fabricius described this species from Siam; Butler says the type is in the Banksian collection at the British Museum, he figures the species, and records it from Sumatra. Not having any Siamese specimens of *Lebadea* to compare with Sumatran ones, I accept Butler's identification; but should the Siamese and Sumatran species be found afterwards to differ, Staudinger's name *sumatrensis* must stand. The genus is a small one, and contains *L. ismene*, Doubleday and Hewitson, from Sikhim, Bhutan, Assam, and Upper Burma, which gradually merges into *L. attenuata*, Moore, from Lower Burma, which again meets *L. martha*, Fabricius = *L. alankara*, Horsfield, in the Malay Peninsula, found also in Sumatra, Java and Banca; another species being *L. paduka* (nec *L. panduka*, Staudinger), Moore, from Borneo. Butler in Trans. Linn. Soc. Lond., Zoology, second series, vol. i, p. 565 (1877) gives both *L. alankara* and *L. martha* from Sumatra, it is hardly probable that two distinct species occur in one island, and, as will be seen above, I consider those two names to represent one species. In our area it occurs from

Selesseh to Namoe Oekor, and as high as Soengei Batoe; is a true butterfly of the forest, settles on leaves with spread wings, and has a decidedly weaker flight than *Limenitis* and *Euthalia.* The sexes differ very much in size, the female being always much larger than the male; often extremely small males are found. It is not a common butterfly.

187. LIMENITIS ALBOMARGINATA, Weymer.

L. albomarginata, Weymer, Stet. Ent. Zeit., vol. xlviii, p. 5, n. 3, pl. ii, fig. 2, *male* (1887).

L. albomarginata, Martin, Einige neue Tagschmetterlinge von Nordost-Sumatra, pt. 2, p. 7, n. 7 (1895).

L. hageni, Staudinger, Iris, vol. v, p. 452 (1892); idem, id., l.c., vol. vii, p 342 (1894).

Padang, West Sumatra, Weymer. Staudinger. This species is a very distinct local race of the Himalayan and Assamese *L. danava*, Moore. It occurs only in Sumatra, and in our area is found only on the Central Plateau, from whence every year a large number of males were brought by the collectors, once only a single female, which Dr. Martin has described (l. c.). As the sexes of this as well as of other butterflies are produced in about equal numbers, it shows clearly the skulking habits of the female that it should be so excessively rare in collections. The same sex of *L. danava* is almost equally rarely seen in India.

188. LIMENITIS DARAXA, Doubleday and Hewitson.

Doherty records this species from Larut Hill, Perak, Malay Peninsula, and describes *L. agneya* from the same hill, but found at 3,000 feet lower elevation (Journ. A. S. B., vol. lx, pt 2, p. 176 (1891). *L. daraxa* is much rarer in our area than the preceding species, and occurs in the same locality. Never more than two or three specimens are captured in one year.

189. LIMENITIS BOCKII, Moore.

L. bockii, Moore, Trans. Ent. Soc. Lond., 1881, p. 308.

Moore. Hagen as *dudu.* Grose Smith as *dudu* and *bockii.* Moore describes this species from Sumatra, and as allied to *L. dudu*, Westwood, from North-Eastern India, differing in being smaller, with a broader transverse white band. The size is unimportant, I possess smaller specimens of *L. dudu* than of *L. bockii*; but the discal band is certainly broader, especially so on the forewing. The rarest of all the species of *Limenitis* in our area, of which Dr. Martin has received during all the period he was in Sumatra not more than ten specimens, nearly all of which were captured near Kampong Naman and Kampong Beras Tepoe on the Central Plateau. Mr. Grose Smith's record of both *L. dudu* and *L. bockii* from Sumatra is almost certainly incorrect.

190. LIMENITIS (*Modusa*) PROCRIS, Cramer.

Hagen. Distant. A common species everywhere, but not found higher than Bekantschan, as the food-plant of the larva does not grow at the higher elevations. The butterfly is fond of wet places and fæces on roads, to which it always returns after being disturbed. If pursued it retires for a short time into the jungle, and settles on the leaves. It is never met with in large forest.

191. PANDITA SINOPE, Moore.

Hagen. Is now very rare in Deli at low elevations, occurs in Dr. Martin's fruit garden at Bindjei and at Selesseh, but never at a higher elevation. In the time before so much of the forest had been destroyed for tobacco cultivation in Deli it was more common, and always shewed a preference for small forest or the boundaries of large forest, seldom found within the precincts of the latter.

192. ATHYMA PERIUS, Linnæus.

Hagen as *perius*, Aurivillius [sic]. Snellen as *leucothoë*. Common everywhere from near the sea and extending to the Central Plateau. This species also was very plentiful before the advent of the tobacco cultivation, but is now somewhat rare in those districts. As soon as those are left behind it appears everywhere on roads and the margins of small forest. It is doubtless a good mimic of our commonest species of *Neptis*, *N. leucothoë*, Cramer, together with which it is always found, and from which it is not easily differentiated on the wing, but, if pursued, it at once assumes its stronger and bolder proper *Athyma*-like flight. Occurs also at Asahan and in the Gayoe-lands.

193. ATHYMA LARYMNA, Doubleday and Hewitson.

Grose Smith. Snellen. The largest of all our *Athymas*, occurs all over our area with the exception perhaps of the Central Plateau. Is decidedly rare, and always found only singly on fæces and moist spots on forest roads. Every year Dr. Martin captured two or three specimens on the muddy banks of the Soengei Diski River near Paya Bakong.

194. ATHYMA IDITA, Moore.

Grose Smith. Has the same range and occurs in similar places as *A. larymna*, Doubleday and Hewitson, but is very rare. In consequence of the beautiful coloration and markings of the underside it is a conspicuous insect when at rest with folded wings.

195. ATHYMA KANWA, Moore.

Snellen. Very rare, more so than the two foregoing species. Found from Bekantschan to Soengei Batoe. Dr. Martin has never seen it on the wing.

196. ATHYMA PRAVARA, Moore.

Butler. Distant. A commoner species than those mentioned above. Occurs in forests in the plains and as high as Namoe Oekor. It is the smallest of our *Athymas*, and is easy to recognise by the club-like streak with rounded end in the discoidal cell of the forewing.

197. ATHYMA RETA, Moore.

Moore as *reta* and *kresna*. Grose Smith as *reta* and *kresna*. Hagen as *reta*, var. ? Kirby. Distant as *kresna*. Butler as *kresna*. Moore described both *A. reta* and *A. kresna* from Sumatra on the same page and figured both. He figures *reta* with all the spots and bands of the upperside pure white ; *A. kresna* with all the markings pale blue except the submarginal band of the hindwing which is white. The markings are precisely similar except that in *A. reta* they are somewhat larger. I have no hesitation whatever in considering these two supposed distinct species to be one and the same, the differential characters given to distinguish them being in my opinion quite non-specific, being based on characters which are obviously variable. The blue coloration of *A. kresna* is almost certainly incorrect. In one place Mr. Moore speaks of the markings as "bluish-white," and in another as "white." It is a common species in Borneo, and occurs also in Lower Burma and the Malay Peninsula. Mr. Moore has suggested that *A. subrata*, Moore, may be a dimorphic form of the female of *A. kresna* = *A. reta*, the ordinary female of which has reddish markings. I possess only males of *A. kresna*, so have no idea what its female is like. *A. subrata* is quite distinct from *A. kresna*, see No. 199, that species being a local race of *A. nefte*, Cramer ; *A. subrata* cannot therefore be the female of *A. kresna*. Together with *A. perius*, Linnæus, and *A. subrata*, Moore, this is the commonest species of the plains, and is met with on nearly every road leading through high forest. The pupa is very richly decorated with gold as usual in the genus.

198. ATHYMA ABIASA, Moore.

Grose Smith. This rare and beautiful species occurs at Soengei

Batoo, 3,000 feet, and even higher. It is easily recognised by the fine white lines before and beyond the large white spot at the end of the discoidal cell of the forewing.

199. Athyma amhara, Druce.

Limenitis selenophora, Snellen (*nec* Kollar), Midden-Sumatra, Lepidoptera, p. 15, n. 1, pl. i, figs. 4, 5, *male* (1892).

Snellen as *selenophora*. Is a local race of *A. selenophora*, Kollar, that species occurring in the Himalayas, Bhutan, Assam, Tavoy in Burma, and Java. The present species is found in the Malay Peninsula, Sumatra, and Borneo. The male differs only from *A. selenophora* in having a submarginal or outer-discal pure white macular instead of a very obscure pale fuscous fascia on the upperside of the hindwing. The females of the two species are indistinguishable. It is the commonest species of *Athyma* of the higher mountains and the Central Plateau, especially plentiful in December and January; found also in Indragiri.

200. Athyma subrata, Moore.

Grose Smith as *subrata* and *nefte*. Hagen as *nefte*. Staudinger as *nefte*. Distant. We have here to do with a very interesting group of species. In Sikhim, Bhutan, Assam and South India the male is much marked on the upperside with yellow, and is the *A. inara* of Doubleday and Hewitson (= *inarina*, Butler). This species gradually merges in Burma into *A. asita*, Moore, specimens absolutely intermediate between *A. asita* and *A. inara* occurring. Further south in the Malay Peninsula, Sumatra, Nias, and Borneo *A. subrata* (= *nivifera*, Butler), occurs. The characters given by Butler to distinguish it from *A. nefte*, Cramer, hold good, so it may be accepted as a good local race. In Java *A. nefte* alone occurs. *A. rufula*, de Nicéville, from the Andaman Isles, and *A. glora*, Kheil, from Nias, are distinct species. *A. inara* and *A. asita* have one female only, which is yellow. *A. subrata* has two females, the one is yellow, the other is brown. It was described from the brown form of female, its male is the *A. nivifera* of Butler. *A. nefte* is also dimorphic, one form being yellow the other brown. The two females of *A. subrata* and the two of *A. nefte* cannot be distinguished, the males alone are different, and the species are kept distinct by me on the male sex alone. *A. rufula* appears to have only one form of female. As noted above, this is a common species of the plains, not occurring higher than Namoe Oekor. The males are found on forest roads, the females inside the forest, of which latter the brown form is less rare than the yellow. The brown form almost certainly mimics *Neptis vikasi*, Horsfield, but there is no large yellow *Neptis* in our area that the yellow form could mimic, though, as Doherty has remarked, size is probably not an insuperable bar to mimicry, as the vertebrate enemies of insects probably think that insects in the perfect state grow as they do themselves, so that our large yellow female *Athyma* probably does mimic the smaller yellow species of *Neptis*, such as *N. hordonia*, Stoll.

201. ATHYMA ASSA, de Nicéville.

A. assa, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. viii, p. 42, n. 5, pl. K, fig. 8, *male* (1893).

Occurs at the same localities and elevations as *A. amhara*, Druce, but is much rarer. It is a beautiful species, of which the first specimens were obtained in 1892.

202. EUTHALIA (*Dophla*) DERMA, Kollar.

Hagen. A very fine, large and rare species which is found from near the sea to the elevation of Bekantschan. It is, like the rare species of *Charaxes*, *Prothoë*, and also *Athyma larymna*, Doubleday and Hewitson, only met with singly or in pairs. Dr. Martin obtained his first pair in 1887 near Toentoengan at a place in a large forest where a Chinese carpenter was sawing wood, and the two butterflies were feeding on the wet sawdust. Dr. Martin possesses specimens from Stabat on the Wampoe River, and from Boekit Mas on the Besitan River. He is under the impression that like a pair of tigers or large birds of prey, which keep a large area of country solely for their own use and benefit and do not allow any other individuals of the same species to intrude into this area, that the above-named large and rare butterflies—but only in the subfamily *Nymphalinæ*—behave similarly, as there are never found more than one or two specimens of each over a large area. The reason for this Dr. Martin is quite unable to explain.

203. EUTHALIA (*Dophla*) DUNYA, Doubleday and Hewitson.

Hagen. Even rarer than *E. derma*, Kollar. Dr. Martin only possesses two specimens, one from Bekantschan, and one from Kampong Singhapura, five miles south of Namoe Ooker, so is probably in Sumatra confined to the outer hills. It is very common in S.-E. Borneo.

204. EUTHALIA (*Dophla*) EURUS, de Nicéville.

E. (*Dophla*) *eurus*, de Nicéville, Journ. A. S. B., vol. lxiii, pt. 2, p. 15, n. 13, pl. ii, figs. 3, *male*; 4, *female* (1894).

Of all the *Euthalias*, this species approaches nearest to the sea, as Dr. Hagen has captured it near Laboean, and Dr. Martin both sexes in the forest between the Saentis Estate and the sea. Found not higher than Bindjei or Selesseh. Both sexes are rare, especially the female

205. EUTHALIA (*Lexias*) DIRTEA, Fabricius.

Hagen. Grose Smith. Butler. Distant. Was a very common species in Deli before the extension of the tobacco cultivation destroyed nearly the whole of the forests; it occurred round nearly every house, and both sexes were easily captured on the kitchen-midden, especially on discarded fragments of fruit thrown out by the Chinese cook. Still very common behind the house of the manager of the Tandjong Djatti Estate, where there is still left a small forest of teak ("djatti" in Malay) trees. Occurs from November to March, never in high virgin forest, not at a greater elevation than Bekantschan. The female is called "The golden-spot butterfly" by Europeans in the Straits Settlements. It settles with wide open-spread wings, at least when feeding. Dr. Dohrn has bred it at Soekaranda. Males of this species from the mountains are on the underside of both wings far darker than specimens from the plains, and a little bluish in hue.

206. EUTHALIA (*Lexias*) PARDALINA, Staudinger.

Symphædra pardalina, Staudinger, Ex. Schmett., p. 154, pl. liv, *male* [as *pardalis*, Staudinger] (1886).

A remarkable species, the male and female being alike, and very similar on the upperside to the female of *E. dirtea*, Fabricius, while the male of *E. dirtea* is entirely different from its female, and is therefore quite dissimilar from that sex of *E. pardalina*. It is very rare, and occurs only at higher elevations, at Soengei Batoo and on the Central Plateau, where *E. dirtea* is never found.

207. *EUTHALIA (*Lexias*) CYANIPARDUS, Butler.

Dr. Hagen informs us that he has himself captured a male of this species (which has already been recorded from Borneo) near the Saentis Estate in Deli, and has obtained females by his collectors from Western Sumatra.

208. EUTHALIA (*Felderia*) COCYTUS, Fabricius.

Vollenhoven as *ludekingii*, described from Sumatra, and *blumei*. Felder, as *mitra* described from Sumatra and Banca. Snellen as *blumei*. Hagen as *blumei*, *ludekingii*, and *cocytina*. Grose Smith as *cocytina* and *diardi*. Butler as *ludekingii*. Staudinger as *blumei*. Semper as *ludekingii*. Kirby as *cocytina* and *ludekingii*. Distant as *cocytina*. Five species of the subgenus *Felderia* have been recorded from Sumatra by different writers as enumerated above. To these names might be added *E. stoliczkana*, Distant, *E. marlayi*, Distant, and *E. puseda*, Moore, given by Mr. Distant in "Rhopalocera Malayana" from the Malay Peninsula

Other probable synonyms are *E. gopia*, Moore, *E. godartii*, Gray, described from Sumatra, and *E. monina*, Fabricius. During the time Mr. W. Davison of the Singapore Museum was alive he devoted much time and pains to no purpose in trying to separate into distinct species the many forms recorded by Mr. Distant from the Malay Peninsula, and to this end captured many hundreds of specimens of both sexes, numbers of which he sent to me. In the forests of Sumatra this protean species is equally common, and Dr. Martin has obtained both sexes in large numbers. He and I have quite failed to split them up into separate species. Dr. Staudinger appears also to have succeeded no better. Both sexes are variable, but it is in the female that the variations are the greater and more puzzling. It is quite easy to assign names in accordance with described species to the more conspicuous varieties, but when one comes to arrange large series of specimens one finds how impossible it is to divide them into separate species. The only solution of the difficulty in splitting up this species appears to lie in extensive breeding from the egg. Even supposing the male primary sexual organs should on microscopical examination disclose specific differences, the difficulty will only be half got over, as the question of pairing the females with the males found to represent distinct species will be quite hopeless till both are bred. I have adopted the oldest name for the group. Dr. O. Staudinger has taken the next oldest name, which is the "*Papilio*" *monina*, also of Fabricius. *E. cocytus* is the commonest species of *Euthalia* occurring in our area, and is found everywhere except on the Central Plateau. The males are very easily damaged, and seldom found in collections in an absolutely perfect state. The male is doubtless mimicked on the wing by the males of *Stibochiona kannegieteri*, Fruhstorfer.

209. EUTHALIA (*Felderia*) ASOKA, Felder.

Snellen. This species was originally described from a female from "Malacca interior" and Borneo; Distant records it from Penang, Province Wellesley, and Malacca. He figures both sexes, and associates with the very distinct female a male with the apex of the forewing rather more produced than in the males of the other species of the group he retains as distinct species, and with the underside of both wings unusually dark, with a broad outer pale margin to the forewing. At the earnest request of Dr. Martin I retain this species as distinct from *E. cocytus*, Fabricius, but it is against my better judgment to do so. The female is typically very distinct, as it has on the upperside of the forewing a prominent band of seven sullied white spots, the anteriormost sometimes divided into two spots, but joined in both Felder's and Distant's figures; the two posteriormost spots in the submedian interspace somewhat small, placed one above the other; between this macular whitish band and the outer margin is a diffused broad pale blue fascia. I find, however, in my large series of females of this group, that these apparently good and distinct characters are not constant, and that it is well nigh impossible to differentiate this form satisfactorily. Mr. Distant's sexing of the species is probably purely guess work, and cannot be accepted finally without some good proof, such as taking the two sexes paired or breeding both from the egg. It is possible that *E. macnairi*, Distant, is a distinct species and is the same as *E. andersonii*, Moore, in which case Distant's name has a year's priority. Dr. Martin notes that *E. asoka* is the rarest species of the group occurring in our area, and that it is found at higher elevations than the others, not lower than Bekantschan.

210. EUTHALIA (*Tanaëcia*) VIKRAMA, Felder.

Felder. Grose Smith as *pulasara*. Butler as *pulasara*. Hagen as *pulasara*, var. ? Kirby. Distant. Originally described from Sumatra. This is a local race of *E.* (*Tanaëcia*) *pulasara*, Moore, from the Malay Peninsula, but is sufficiently different to be retained as a distinct species. Not rare in the plains of Sumatra.

211. *EUTHALIA (*Tanaëcia*) PELEA, Fabricius.

Snellen. Grose Smith as *palguna*. As far as I am aware, this species is confined to Java, from whence I possess specimens of both sexes. Mr. Moore has figured the male as "*Adolias*" *palguna*, Moore, which is a synonym of *E. pelea.*

212. *EUTHALIA (*Tanaëcia*) SUPERCILIA, Butler.

Grose Smith. Originally described from Penang. Mr. Butler has figured a male. It is entirely unknown to us.

213. EUTHALIA (*Tanaëcia*) PHINTIA, Weymer.

Tanaëcia phintia, Weymer, Stet. Ent. Zeit, vol. xlviii, p. 7, n. 5, pl. i, fig. 6, *male* (1887).

Weymer. Grose Smith as *aruna*. Originally described from Sumatra. This species is a local race of *E.* (*Tanaëcia*) *aruna*, Felder = "*Adolias*" *pardalis*, Vollenhoven, from the Malay Peninsula and Java, but is easily separable from that species. Rather rare, and only occurs at higher elevations and south of Namoe Ookor, at Bekantschan and Soengei Batoe.

214. **Euthalia** (*Tanaëcia*) **martigena**, Weymer.

Tanaëcia martigena, Weymer, Stet. Ent. Zeit., vol. xlviii, p. 8, n. 6, pl. i, fig. 7, *female* (1887).

Weymer. Originally described from Sumatra. Occurs in the same localities as the last, and is equally uncommon.

215. **Euthalia nicevillei**, Distant.

One of the rarest insects of our fauna, Dr. Martin having obtained only two specimens during the years he collected in Sumatra, and Dr. Hagen none at all. Found at an elevation of not less than 3,000 feet. It probably escapes capture by the collectors as it is so similar in general appearance to *E. cocytus*, Fabricius, and is thus often passed over for that species.

216. **Euthalia** (————) **kanda**, Moore.

Hagen. Originally described from Borneo. Dr. Martin has obtained a few specimens at Selesseh, but it is very rare.

217. **Euthalia** (————) **elone**, de Nicéville.

E. (*Tanaëcia ?*) *elone*, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. viii, p. 47, n. 7, pl. L, fig. 3, *male* (1893).

Expanse: ♀, 3·1 to 3·2 inches.

Description: **Female**. Differs from the male only in its larger size, paler coloration on both surfaces, and on the underside in the absence of the violet suffusion, especially on the hindwing.

A very rare species, found only on the Central Plateau in July and August. Dr. Hagen obtained this species before Dr. Martin, and sent it to London for identification, but unsuccessfully; nor was Dr. Martin more fortunate in sending it to Berlin for the same purpose somewhat later.

218. **Euthalia garuda**, Moore.

Vollenhoven. Hagen. Staudinger. Whilst all the species of *Euthalia* abovementioned, with the exception of *E. dirtea*, Fabricius, and also all that follow except *E. adonia*, Cramer, are more or less inhabitants of the forest, this species appears only near human habitations, as the food-plant of the larva is the leaves of the mangoe tree, which is always planted near villages and round houses. It is not found therefore at higher elevations, as that fruit tree even at Namoe Oekor does not flourish as it does in the plains. It is most plentiful in January and February, when the males may be continually seen pursuing each other from the shade of one mangoe tree to another.

219. EUTHALIA JAMA, Felder.

Hagen. Dr. Martin possesses three males only of this species, all from higher elevations south of Bekantschan.

220. EUTHALIA ERIPHYLÆ, de Nicéville.

E. eriphylæ, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. vi, p. 353, n. 7 pl. F, fig 7, *male* (1891).

E. delmana, Swinhoe, Trans. Ent. Soc. Lond., 1893, p. 287, n. 178.

Found in the Khasi Hills; the Ataran Valley, Meplé and the Daunat Range in Middle Tenasserim, Burma; and at Bekantschan at the foot of the Battak mountains in September, but it appears to be everywhere rare. The type specimen figured and described by me appears to be the dry-season form of this species, which is not found in Sumatra, and is much paler coloured with more prominent markings than the rainy-season form.

221. *EUTHALIA ALPHEDA, Godart.

Snellen. Both sexes have been figured by Mr. Moore in Trans. Ent. Soc. Lond., New (second) Series, vol. v, p. 66, n. 6, pl. iii, fig. 4 (1858). As far as I am aware, it is confined to Java, from whence I have obtained specimens, unless, as seems probable, the *E. jama* of Distant, but not of Felder, from Province Wellesley and Malacca, is a synonym of *E. alpheda*, in which case it occurs also in the Malay Peninsula (Rhop. Malay., p. 119, n. 4, pl. xiv, fig. 8, *male*, pl. xv, fig. 4, *female* (1883).

222. EUTHALIA AGNIS, Vollenhoven.

Adolias agnis, Vollenhoven, Tijd. voor Ent., vol. v, p. 202, n. 27, pl. xii, fig. 2, *female* (1862).

Euthalia agnis, Fruhstorfer, Berl. Ent. Zeit., vol. xxxix, p. 245, pl. xviii, fig. 8, *male* (1894).

Recorded from Java by Vollenhoven and Fruhstorfer. In Sumatra it is only found in the Battak mountains from June to August, and is very rare.

223. EUTHALIA MERTA, Moore.

Grose Smith. Originally recorded from China by Mr. Moore, but probably in error. It is found in the Malay Peninsula and at Selesseh in Sumatra, but is excessively rare everywhere.

224. EUTHALIA SAKII, de Nicéville.

E. sakii, de Nicéville, Journ. A. S. B., vol. lxiii, pt. 2, p. 9, n. 8, pl. iii, fig 3, *female* (1894).

The type is unique, and Dr. Martin says came from Selesseh.

225. ***Euthalia parta**, Moore.

Hagen. Originally described from Borneo. Unknown to us.

226. **Euthalia? zichri**, Butler.

Originally described (but not figured) from Sarawak in Borneo. Distant describes and figures it from Malacca, but neither figure or description exactly agrees with Butler's description of the species. Nor do our Sumatran specimens agree much better with the type or the Malacca example. We have here to do either with one very variable species, or several local races. A considerable series from various localities is required to settle the point. In Sumatra it is exceedingly rare, Dr. Martin has obtained two or three specimens only from the mountains.

227. **Euthalia anosia**, Moore.

Hagen. Everywhere rare throughout its considerable range of habitat. Dr. Martin possesses a single specimen from Kampong Singhapura, south of Namoe Oekor, captured in April, 1891. Besides this specimen Dr. Martin caught another himself at Ayer Panas, 18 miles inland from the town of Malacca, and near the spot where Dr. A. R. Wallace, F.R.S., captured the type of *Prothoë calydonia*, Hewitson, and a third in April, 1895, at the lower end of the Jibi Kola, near Darjiling, in the eastern Himalayas, all these specimens from widely separated localities are precisely similar.

228. **Euthalia lubentina**, Cramer.

Hagen as *lubentina*, Horsfield and Moore [sic]. A rare species in Sumatra as elsewhere. Occurs at higher elevations in Sumatra, at Soengei Batoe and in the Gayoe mountains. Dr. Martin obtained one pair at Kotta Lembaroe in Deli in 1888.

229. **Euthalia adonia**, Cramer.

Vollenhoven. Hagen as *adonia*, Horsfield and Moore [sic]. Grose Smith as *adoma* [sic]. Staudinger. Very rare, Dr. Martin has obtained a single female. It seems to occur at the same elevations and localities as *E. garuda*, Moore, and the larva probably feeds on the same tree (mangoe). The specimen now in Dr. Martin's collection was caught by himself on a small mangoe tree behind the Chinese merchant's house near the Battak resthouse in Bindjei town. He saw a second in June, 1894, also on a mangoe tree in the garden of the Loboe Dalam hospital, but as he was on duty, he could not secure it. He has never seen a male.

230. EUTHALIA (*Nora*) RAMADA, Moore.

Hagen. Not very common, found from Selesseh to Bekantschan.

231. EUTHALIA (*Nora*) DECORATA, Butler.

Originally described as *Adolias decoratus* from Singapore, and both sexes figured by Butler.

232. EUTHALIA (*Nora*) ERANA, de Nicéville.

E. (*Nora*) *erana*, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. viii, p. 46, n. 6, pl. L, figs. 1, *male*; 2, *female* (1893).

Snellen as *salia*. Hagen as *salia*. The *E.* (*Nora*) *salia* of Moore is quite distinct from the present species, and is confined to Java, from whence I possess both sexes. *E. erana* is very near to *E. decorata*, Butler, but the much less extent of the bronzy-greenish (in some specimens purplish) coloration, and the greater width and purer whiteness of the inner macular band of the hindwing on the upperside will at once distinguish the males of the two species. Together with *E. decorata* it is found in both large and small forests, and at no very great elevation. Neither species is rare.

233. *EUTHALIA (*Nora ?*) LAVERNA, Butler.

Hagen. Grose Smith. The male is figured in colours by Mr. Distant from Malacca, the female in black and white from Penang. We have been unable to recognise it from Sumatra. Distant's figure of the male has much more the appearance of a female than of the opposite sex. The Bornean form I have named *E.* (*Nora*) *lavernalis*.

234. PYRAMEIS CARDUI, Linnæus.

Snellen. Hagen. Grose Smith. Semper. This cosmopolitan butterfly occurs only on the grassy plains of the Central Plateau, often in large numbers. Dr. Martin only once met with a specimen in the plains near Toentoengan in June, 1888, where it might have been carried by one of the sudden storms known locally as "Sumatrans." The late Herr Honrath, to whom Dr. Martin sent specimens of this species in a letter, at a meeting of the Berlin Entomological Society drew attention to the conspicuously small size, the much darker than normal coloration of the upperside of the hindwing, and the unusually large white triangular spot present on the underside of the hindwing of the Sumatran form.

235. *PYRAMEIS SAMANI, Hagen.

P. samani, Hagen, Iris, vol. vii, p. 359 (1894).

Dr. Hagen described this species from a single torn example obtained in the Karo hills. It is near to *P. dejeanii*, Godart, from Java. Dr. Martin has seen the specimen, which seems to represent a very good though rare species, as his Battak collectors never succeeded in capturing it. It will probably be found more plentifully when the mountains of the Gayoo- and Allas-lands are explored.

236. VANESSA BATTAKANA, de Nicéville, n. sp.

HABITAT: N.-E. Sumatra.

EXPANSE: ♂, 2·5; ♀, 2·6 inches.

DESCRIPTION: MALE and FEMALE. Nearest to *V. perakana*, Distant, from the Malay Peninsula, from which it may be known by the discal blue band on the UPPERSIDE of the *hindwing* being much broader, invading the discoidal cell; in the type of *V. perakana*, now before me, which is a female, it is much narrower, not nearly extending to the cell. The Javan agrees with the Perak species in this feature.

Occurs on the Central Plateau and the high mountains which surround it in May and December, but is very rare, as Dr. Martin has not obtained more than eight or ten specimens during his residence in Sumatra. Dr. Hagen has recently caught it in South Sumatra on Mount Kaba, 5,200 feet, a volcano near Mount Dempo, which is also a volcano.

237. SYMBRENTHIA HIPPOCLUS, Cramer.

Hagen as *hyppoclus* [sic]. Staudinger as *hyppoclus* [sic].

238. SYMBRENTHIA COTANDA, Moore.

Hagen as *hypselis*, Godardt [sic]. Staudinger as *hypselis*. I consider that the true *S. hypselis*, Godart, is confined to Java; the Indian, Burmese, Malayan Peninsula and Sumatran form being *S. cotanda*, Moore=*S. sinis*, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. vi, p. 357, n. 10, pl. F, fig. 9, *male* (1891).

239. SYMBRENTHIA HYPATIA, Wallace.

S. hypatia, Fruhstorfer, Stet. Ent. Zeit., vol. lv, p. 125, pl. iii, fig. 4, *male* (1891).

Hagen. Distant has figured this species from Perak, and Fruhstorfer from W. Java, both from males, but neither figure is good. The three Sumatran species of *Symbrenthia* are fairly common on suitable spots, and are thus distributed:—*S. hippoclus*, Cramer, occurs nearest to the sea, but extends over the whole of our area up to the Central Plateau. *S. cotanda*, Moore, first appears south of Namoe Ookor, Dr. Martin took his first specimen near Kampong Singhapura. *S. hypatia* is first met with at the elevation of Bekantschan; both the last-named species extend to the Central Plateau. They like low and small forest, or open places in large forest, and settle on roads and also on the leaves of shrubs and low-growing plants with open wings. Dr. Martin has bred *S. hippoclus* on the Rameh plant (*Urticaceæ*); the larvæ live socially, five or six together, in a single leaf with its edges joined by silk strands so as to make a shelter. The pupæ are somewhat similar to those of *Vanessa urticæ*, Linnæus, the "Small Tortoishell Butterfly" of Europe, and like the species of *Vanessa* and *Pyrameis* the newly-emerged butterfly emits a pigmented fluid of a red colour. The larvæ are common in November and December, the butterflies are very plentiful during the first months of the year, but all the remaining months of the year they are only seen sporadically and rarely. It appears possible that *S. hippoclus* is single-brooded, and that some surviving examples live throughout the year and propagate the species the next season. The second (white) form of female which occurs in Java is not found in Sumatra. All the species of *Symbrenthia* are on the upperside of the wings very similar to the small yellow species of *Neptis*, which they may perhaps mimic when at rest, but their flight is totally different, being excessively rapid, so that it is almost impossible to follow them with the eye.

240. Rhinopalpa polynice, Cramer.

Hagen. Semper as *polinice* [sic]. Kirby. Staudinger. This species was described and figured by Cramer from a male from the west coast of Sumatra. *R. fulva*, Felder, described from Malacca, is an absolute synonym, specimens from Assam, Burma, and the Malay Peninsula being indistinguishable from Sumatran ones. The Javan species, *R. elpinice*, Felder, is quite distinct. *R. polynice* is found only in large forest, and occurs all over our area except in the higher mountains and on the Central Plateau. The males are fond of fæces on forest roads; the females are very rare and seldom seen in collections. Perhaps they escape capture by their coloration being very different from that of the males, as on the wing the female closely resembles a common *Cirrhochroa*.

241. Cyrestis nivalis, Felder.

C. nivea, Zinken-Sommer, var. *interrupta*, Snellen, Tijd. voor Ent., vol. xxxiii, p. 217 (1890).

Grose Smith as *nivea*. Snellen as *recaranus*, Westwood (= *nivea*, Zinken-Sommer, *teste* Snellen), and as *nivea*, var. *interrupta*. Hagen as *nivea*. Staudinger as *nivea* var. *nivalis*, and *nivalis*. *C. nivalis* is a good species, and is found commonly in Burma, the Malay Peninsula, Sumatra and Borneo, and differs from *C. nivea*, Zinken-Sommer, from

Java "In not having a continuous fuscous [costal] margin to the forewing on the upperside, and in the greater amount of ochraceous coloration near the anal angle of the hindwing on the upperside." (*Distant*). Found in Sumatra from near the sea to Soengei Batoe on forest roads, where it settles with wide-spread wings on moist places and by the side of small pools; if pursued it settles on the underside of leaves by the roadside. On the wing when flying rapidly along a forest road in search of moisture it may easily be taken for a pierine butterfly. All the butterflies of this genus in India are well named "The Map" from their characteristic markings and coloration.

242. CYRESTIS IRMÆ, Forbes.

C. irmæ, Forbes, A Naturalist's Wanderings, p. 274 (1885).
C. mænalis, var. *sumatrensis*, Staudinger, Ex. Schmett., p. 133 (1886).

Forbes. Staudinger as *mænalis*, var. *sumatrensis*. Semper as *mænalis*. I have redescribed this species in Journ. Bomb. Nat. Hist. Soc., vol. vi, p. 358, n. 11 (1891). It occurs in the hills of Perak in the Malay Peninsula at 3-4,000 feet elevation. *C. mænalis*, Erichson, is a distinct species, and is found in the Philippine Isles. From the point where *C. nivalis*, Felder, no longer occurs, at Soengei Batoe and on the higher mountains and the Central Plateau, this beautiful and very distinct species is found commonly throughout the year. It is somewhat smaller than *C. nivalis*. The Battak collectors report that it comes down to the small hill streams in crowds with numerous *Pierinæ* to suck up the moisture.

243. CYRESTIS PERIANDER, Fabricius.

Grose Smith, Staudinger. This beautiful species occurs only on the western boundary of our area at higher elevations. Herr M. Ude, the European collector of Dr. H. Dohrn, took some thirty specimens near Bohorok in May, 1894. Dr. Martin obtained his first specimens from Kepras in January, 1895, and also a single example, perhaps a straggler to the south-east, from the Karo mountains in December, 1894. Dr. Martin has caught it himself on the Penang Hill, or "The Crag."

244. CYRESTIS THERESÆ, de Nicéville.

C. theresæ, de Nicéville, Journ. A. S. B., vol. lxiii, pt. 2, p. 18, n. 14, pl. v, fig. 8, *male* (1894).

Dr. Martin obtained a single specimen in May, 1893, from the forest near Selesseh, caught by a very clever and intelligent Chinese collector. Mr. de Nicéville recognised it at once as a species new to science, and at Dr. Martin's request named it in honour of H. R. H. Princess Therese of Bavaria, who is well-known by her valuable works as a scientific traveller. As Dr. Martin almost simultaneously received a large consignment of butterflies from S.-E. Borneo (Bandjermasin), and amongst them a considerable number of this species, we were surprised to find that it had not already been described from that island. It is probable that it previously stood in collections as the really very distinct *C. lutea*, Zinken-Sommer. The late Professor Westwood appears to have been of opinion that the yellow male of *C. lutea* has a *white* female. I have never seen a female of that species, though the male is excessively common. Even Dr. Staudinger has no female in his unrivalled collection so he writes to me. *C. theresæ* stands in his collection under the MS. name of *C. thyonneoides*, from Borneo.

245. CYRESTIS (*Chersonesia*) RAHRIA, Moore.

Hagen as *rahria*, Westwood [sic]. Staudinger as *rahria*, Westwood [sic]. A common species in Burma, the Malay Peninsula, Nias, Sumatra, Java, and Borneo. The name *rahria* is a MS. one of Westwood's; as Moore figured it (though he did not describe it), the species is properly Moore's.

246. CYRESTIS (*Chersonesia*) INTERMEDIA, Martin.

C. intermedia, Martin, Einige neue Tagschmetterlinge von Nordost-Sumatra, pt. 2, p. 4, n. 5 (1895).

247. CYRESTIS (*Chersonesia*) PERAKA, Distant.

Always a rare species, I possess specimens from the Daunat Range, Tenasserim, Burma; Perak in the Malay Peninsula; and Bekantschan and the Battak mountains of Sumatra taken in July and October. Dr. Martin has specimens from Java.

248. CYRESTIS (*Chersonesia*) NICEVILLEI, Martin.

C. nicévillei, Martin, Einige neue Tagschmetterlinge von Nordost-Sumatra, pt. 2, p. 4, n. 6 (1895).

Rare, occurs only in the Battak mountains in May and July. It is a very distinct species, the coloration of the upperside is of a very rich and deep orange, and the fourth pair of black lines counting from the base of the wing on the upperside of the forewing is twice broken, a unique character in the subgenus.

249. CYRESTIS (*Chersonesia*) CYANEE, de Nicéville.

C. (Chersonesia) cyanee, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. viii, p. 49, n. 8, pl. L, figs. 6, *male*; 7, *female* (1893).

A local race of *C. risa*, Doubleday and Hewitson, found from

Kumaon to Assam and in Burma, also recorded from Java. Dr. Martin in "Einige neue Tagschmetterlinge von Nordost-Sumatra," pt. 2, p. 7, (1895), records *C. cyanee* from Burma, but probably in error, as far as I know it is confined to N.-E. Sumatra. All the species of *Chersonesia* in Sumatra occur only in forests, and unlike true *Cyrestes* never go to roads or moist places, but keep to low bushes and rest on the underside of the leaves. They fly weakly and are easily captured. Nearest to the sea, plentiful near Laboean, appears *C. rahria*, Moore. Higher up, from Namoe Oekor to Bekantschan, occurs the small *C. peraka*, Distant. From Bekantschan to the Central Plateau fly *C. cyanee* and *C. nicévillei*, Martin. *C. intermedia*, Martin, is confined to the North-Western limits of our area, as all the specimens were obtained from the Gayoe collectors. *C. rahria* and *C. cyanee* are the common species, *C. peraka* and *C. intermedia* are very rare, and the most beautiful and distinct *C. nicévillei* is the rarest of all.

250. KALLIMA BUXTONI, Moore.

Snellen as *paralecta* Hagen as *paralecta*. Both sexes of this species were originally described from Sumatra; it occurs also in the Malay Peninsula at Perak and Sungei Ujong, and again in Borneo. The apex of the forewing in the female is not produced into a long point in this species as it is in many others. I was incorrect in stating in the Gazetteer of Sikhim, p. 146, n. 226 (1894) that the Sumatran *Kallima* like the Javan *K. paralecta*, Horsfield, has a yellow-banded male and a bluish-white-banded female, both sexes being alike in this particular. When writing the paragraph in question, I had yellow males and bluish-white females only from Sumatra, so came to the perhaps natural conclusion that the phenomenon which is unique in the Javan occurs also in the Sumatran species. Since then I have obtained both sexes of both the Sumatran species of *Kallima*, and find that the opposite sexes of each are alike. *K. buxtoni* is always a rare insect in Deli, occurring from Selesseh to Bekantschan. It is very fond of imbibing the sap from wounded trees. The Malay and Javan collectors call it "Koepoe Bandera, the Flag Butterfly," as its red and blue colours resemble the same colours in the Dutch tricolour.

251. KALLIMA SPIRIDIVA, Grose Smith.

K. spiridiva, Grose Smith, A Naturalist's Wanderings, p. 274 (1885); *K. spiridion*, Grose Smith and Kirby, Rhop. Ex., pl. *Kallima* i, figs. 1, 2, *male* (1892).

Grose Smith. FEMALE differs from the male only in the hindwing on the upperside being paler, more brown; and in the forewing having the apex produced into a somewhat short point, half the length of that found in the female of *K. knyvettii*, de Nicéville, from Bhutan, which is a closely allied species. Occurs at higher elevations than *K. buxtoni*, Moore, from Bekantschan to the mountains which surround the Central Plateau, in April and July; is also rarer than the yellow species. Both are found only in large forest.

252. DOLESCHALLIA PRATIPA, Felder.

Snellen as *bisaltide*. Hagen as *bisaltide* and *pratipa*. Distant doubtfully from Sumatra as *bisaltide*. The Sumatran form agrees exactly with the one from the Malay Peninsula which has been described by Felder as *D. pratipa*. Whether it should be known by the older names of *D. bisaltide* or *D. polibete*, both of Cramer, I am not prepared to say, as several of the species of this genus are so variable that to define their limits seems the more difficult the greater number of specimens one obtains, more especially as the variations do not appear to be confined to geographical areas. The female of the Sumatran form agrees very fairly with Cramer's figures C and D of pl. cii of Pap. Ex., which also appears to have been taken from a female, and is named "*Papilio*" *bisaltide* from "Surinam," a probable *lapsus calami* for Sumatra. But I have no specimen agreeing exactly with that figure. The Himalayan, Assamese, Burman, South Indian, Ceylonese, Andamanese and Nicobarese form is fairly constant, and is usually identified as *D. polibete*, originally described from Amboina. Hagen records two species of the genus from Sumatra, but this is almost certainly incorrect. *D. pratipa* in Sumatra flies from near the sea to the elevation of Bekantschan, but not higher, and is found in forests and also near houses which are surrounded by fruit trees and small jungle. The females are much rarer than the males. The latter are especially partial to settling on old wood, and are commonly found resting on or flying round wooden bridges on forest roads. Dr. Martin has frequently noticed them resting on wooden bullock carts left on jungle roads, to which they return again and again if disturbed. Dr. Hagen bred it at Laboean, the larva feeding on the Jack-tree (*Artocarpus integrifolia*, Linnæus).

253. CHARAXES (*Eulepis*) DELPHIS, Doubleday.

Hagen. Kirby as *concha*. The *C. concha* of Vollenhoven was described from Padang, Sumatra, and is a synonym of this species. Next to *C. kadenii*, Felder, this is the most beautiful species of *Charaxes* found in Sumatra. It occurs from near the sea to the elevation of Bekantschan, but not higher. Though it is met with everywhere over a large area it is never as plentiful as are *C. dolon*, Westwood, and *C. eudamippus*, Doubleday, in Sikhim in the beds of streams in the spring. As the

Gayoe collectors brought this species in some numbers, it may perhaps be less rare in the north of Sumatra. No female has been obtained. The male is fond of fæces on forest roads; also small pools and moist places on roads, especially if there are any *Pierinæ* assembled to suck up the moisture, with whom the big *Charaxes* always associates. In such spots will be found sitting in the hottest sun perhaps half a hundred or more *Catopsilias* and *Appias hippo*, Cramer, and amongst them one *Charaxes delphis*, numbers of similarly-coloured butterflies evidently affording mutual protection. Dr. Martin's Javan collector Saki in consequence of this characteristic used to call *C. delphis* the "Koepoe Raja," because it sat amongst the *Pierinæ* like a Raja surrounded by his followers. *C. delphis* is not restricted only to big jungle, but is found on roads far from the forest, if only there are assembled the protecting *Pierinæ*. Dr. Martin notes that in 1886 he gave up collecting for some time, till in August, 1887, when on his way to pay a medical visit at the Kloempang Estate, he saw at five o'clock in the evening a fine specimen of *C. delphis*, which was seeking a comfortable night's lodging under the roof of a tobacco shed. As Dr. Martin was on horseback he could not catch the butterfly, but on shewing it to a passing Chinese coolie this man was so clever as to kill it without any damage by throwing a piece of wood at it. Dr. Martin took it home in his note book, and from that day commenced a new collection on pins, which is now in the Royal Museum at Munich, and of course includes this specimen which instigated his commencing to re-collect, and to which may also be due the production of this paper.

254. *CHARAXES (*Eulepis*) SCHREIBERI, Godart.

Dr. Hagen informed Dr. Martin that he obtained this rare species from his Gayoe collectors. It would appear that the north-western boundary of our area is the head-quarters of the genus in Sumatra, as the Gayoes always brought in three or four times as many specimens of *Charaxes* as the Battaks did. *C. schreiberi* probably does occur in Sumatra, as it is certainly found in the Malay Peninsula, Java and Borneo. It is singular, however, that Dr. Hagen should have omitted it from both his papers. Dr. Martin picked up from the ground two forewings without body of this species in Fort Canning in the middle of Singapore. It is most remarkable how frequently the only record we have of this species is from single wings picked up in a similar way. It would seem to be that *C. schreiberi* is greatly persecuted by birds.

255. CHARAXES (*Eulepis*) KADENII, Felder.

Dr. Wallace obtained the first known specimen of *C. kadenii* in

Western Java at a high elevation in 1861, and very appropriately called it "The Calliper Butterfly," since when only very few specimens have reached Europe. In 1889 Dr. Martin found only one old and worn specimen in all the larger German collections when visited by him, which specimen is now in the Berlin Museum. The first in Sumatra was obtained from the Central Plateau in 1892, where alone it is found, and although Dr. Martin offered a special bonus of a dollar for every further specimen, only seven in all were brought in. Nearly all were captured on the fæces of Karbouw buffaloes, deposited on the sandy river banks where the buffaloes used to drink. Herr H. Fruhstorfer was sent to Java by the late Herr Honrath to collect *Rhopalocera*, but with special instructions to look out for *C. kadenii*, but he was not successful in getting it. Since then a retired non-commissioned officer of the Dutch Indian Army settled in Java, Heer C. E. Prillwitz, has captured eight specimens in Preanger.

256. CHARAXES (*Eulepis*) ATHAMAS, Drury.

Snellen. Hagen as *athamas* and *samatha*. Mr. Moore described *C. samatha* from Tenasserim, and afterwards recorded and figured it from Ceylon. It is a synonym of *C. athamas*, which latter is without doubt the commonest of all the *Charaxes* in Deli, occurring from near the sea to Bekantschan and Soengei Batoe; females are very rare. The males are very fond of moist places and fæces, to which they will always return after being disturbed; when frightened they retire temporarily to the leaves of the higher trees well out of reach, and settle with folded wings. On the wing they are not easily differentiated from the *Pierinæ*, only their flight is very much stronger and more rapid.

257. CHARAXES (*Eulepis*) HEBE, Butler.

Grose Smith. Butler. Staudinger. Kirby. Distant. Originally described from Sumatra.

258. CHARAXES (*Eulepis*) MOORI, Distant.

Hagen.

259. CHARAXES (*Eulepis*) JALYSUS, Felder.

We have here to do with three very difficult species, or perhaps we may say two, as *C. jalysus* appears to be fairly constant, though I am not at all sure that it will not hereafter be found to gradually merge into the two previously-named species. *C. jalysus* has the greenish-white areas of both wings on both sides the largest of the three. *C. moori* appears to be best distinguished from *C. hebe* by having the inner edge of the broad outer black margin to the forewing on the upperside straight and even, ending sharply on the inner margin of the wing at some distance from the inner angle, in *C. hebe* the inner edge of the band is much waved, it does not end sharply on the inner margin, and it often ends at the anal angle instead of extending along the inner margin for some distance as it always does in *C. moori.* The width of the outer black border to the hindwing on the upperside is very variable, but it appears to be usually broader and better defined in *C. moori* than in *C. hebe*, in which latter species it is sometimes reduced to a double series of black spots (as in Butler's figure) being the remnants of incomplete ocelli. The width and extent of the greenish-white areas on the underside are excessively variable in the two species, and as far as I can judge from my large series of specimens from the Malay Peninsula, Sumatra, Java, and Borneo, present no specific characters. Herr Röber in Ent. Nach., vol. xx, p. 290, and vol. xxi, p. 63 (1894-95), has been at the pains to define the *athamas*, *hebe*, and *jalysus* groups of *Charaxes*, and describes many new species, with which we have to deal with *C. heracles*, Röber, from Borneo (in his first paper), and from Borneo and Deli in Sumatra (in his second paper), supposed to be a local race of *C. moori*; and *C. albanus*, Röber, from Deli, Sumatra, supposed to be a local race of *C. hebe.* These two species have been described from most inadequate material, and are in my opinion absolute synonyms of *C. moori* and *C. hebe* respectively. Considering the many bad species that have been created in the *C. athamas* group, it is extraordinary that Herr Röber should have evolved a similar chaos in the *C. hebe* group. In the *C. athamas* group he describes from single female examples *C. fruhstorferi* from South Java, and *C. phrixus*, also from Java, while admitting that he has never seen the female of the most common of all the species of the group, *C. athamas*, Drury. In his first paper he puts *C. hebe* and *C. moori* in one group, in his second paper he makes two groups of them. In his first paper he gives *C. hebe* from Sumatra, in his second he gives the Sumatran form of *C. hebe* a new specific name, though the species was originally described from Sumatra, and names the Javan form of *C. hebe*—*C. javanus.* Mr. Fruhstorfer in Ent. Nach., vol. xxi, p. 197 (1895) has described still another *Charaxes* from North Borneo of the *moori* group, which he has named *C. sandakanus.*

The three foregoing species are all much rarer than *C. athamas*, but are quite similar in their habits. *C. hebe* and *C. moori* occur at lower elevations in the Battak mountains from Selesseh to Bekantschan, whereas *C. jalysus* was mostly captured by the Gayoe collectors in the forests west of Langkat leading to their country. We have seen no females of either of these species.

260. CHARAXES ECHO, Butler.

Originally described from Singapore, recorded from Borneo by Druce. It is one of the rarest insects in our area, as two specimens only have been captured, both in high forest near Selesseh. It is smaller and darker than the allied *C. fabius*, Fabricius, of India and Burma.

261. CHARAXES (*Haridra*) BORNEENSIS, Butler.

Grose Smith. Distant. Like *C. delphis*, Doubleday, and *C. jalysus*, Felder, except a few specimens from the Battak mountains, has only been captured in the forests west and north of Selesseh, by the Gayoes while collecting gutta percha. Dr. Martin possesses one specimen taken in Asahan in 1891. We have not seen its female.

262. CHARAXES (*Haridra*) DURNFORDI, Distant.

This species was originally described from Sungei Ujong in the Malay Peninsula from a single male. An allied species is *C. nicholii*, Grose Smith, described from Burma, and figured in Rhopalocera Exotica, vol. i, pl. *Charaxes* ii, figs. 1, 2, *male* (1887). I possess a single specimen of this very rare species caught by Colonel C. T. Bingham in October, in the bed of the Kaukareit stream at the foot of the Daunat Range, Tenasserim, which differs from the figure of *C. nicholii* in its larger size, the ocelli on the upperside of the hindwing larger, within which from the costal nervure to the first median nervule is a waved black line, anteriorly prominent, posteriorly becoming obsolete. *C. durnfordi* is very rare in Sumatra, rarer even than *C. kadenii*, Felder, as Dr. Martin obtained only five specimens. Occurs in heavy forest on the lower ranges and outer spurs of the Battak mountains, where Dr. Martin in 1888 captured his first male specimen at Roemah Kenangkong, now in the royal collection at Munich. Dr. Hagen took a male in 1891, at Bandar Quala in Serdang. In 1892 Dr. Martin received a female from a Battak collector, which is larger and duller coloured than the male, the whitish-violet markings on the upperside of the hindwing of greater extent, and the tails longer.

263. CHARAXES (*Haridra*) HARPAX, Felder.

Hagen. Snellen as *polyxena*. Moore. It was originally described without habitat; and has been recorded from Lower Burma, the Malay Peninsula, Sumatra, and Borneo. *C. polyxena*, Cramer, was described from a male from China, and is the oldest name of all the tawny group of *Charaxes*. *C. harpax* is found in Sumatra from the sea (Paya Bakong) to Bekantschan. It occurs in every forest, where it is especially partial to fæces and moist spots. It is a very variable insect as regards the extent of the black coloration on the upperside of the forewing, and the colouring of both wings on the underside. Some of our specimens agree very well with Mr. Moore's figures of *C. corax*, Felder, in Lep. Ind., vol. ii, pl. clxxv (1895). This species is restricted by Mr. Moore to Sikhim, Bhutan, Assam and Burma. Other specimens agree very closely with the figures of *C. hierax*, Felder, given on the next plate of Mr. Moore's work above mentioned, and recorded by him from Assam only. Of the three names, *harpax*, *corax*, and *hierax*, the last is the oldest. It is more than probable, however, that the species will hereafter stand as *C. baya*, Moore, originally described from Java, which is still older, and with the description of which (it has never been figured) some of our specimens agree very closely. The females are very rare; Dr. Martin possesses two only. The tails are much longer than in the male, and somewhat spoon-shaped, one specimen in Dr. Martin's collection has two tails, one each at the terminations of the first and third median nervules.

264. CHARAXES (*Haridra*) ARISTOGITON, Felder.

Originally described without locality, but found in the eastern Himalayas, Assam, Burma, the Malay Peninsula, and Sumatra. Our specimens agree better with Mr. Moore's figures of *C. desa*, Moore, Lep. Ind., pl. clxxii, from Lower Burma, but I am not prepared to admit that species to be distinct from *C. aristogiton*. Occurs only at the higher elevations, from Bekantschan to the Central Plateau, is not very common, and is not at all variable as is *C. harpax*, Felder. The underside of both wings is of a richer and darker red than in specimens from Sikhim. No female has been obtained.

265. CHARAXES (*Haridra*) DISTANTI, Honrath.

Originally described from Perak and Sarawak (Borneo). It is perhaps a local race of *C. marmax*, Westwood, from the eastern Himalayas, Assam and Burma, but may be instantly known from it by the basal half of the costa of the forewing on the underside being pure snow-white instead of concolorous with the rest of the wing. Occurs in Middle Tenasserim of Lower Burma, and in Sumatra in the forests of the plains, at Paya Bakong and at Selesseh, perhaps not higher than Namoe Oekor. It is a rare species, and we have not seen its female.

266. PROTHOE CALYDONIA, Hewitson.

Originally described from Malacca. Two local races of this splendid butterfly have recently been defined, *P. belisama*, Crowley, from Tonghou, Central Burma, and *P. chrysodonia*, Staudinger, from Davao, S.-E. Mindanao, in the Philippine Isles. In Sumatra *P. calydonia* is found only in forest from Selesseh to Bekantschan and higher, and is rare as it always is everywhere. Dr. Martin took his first specimen, the first known from Sumatra, in October, 1888, near Kampong Roemah Kenangkong on a wounded tree where it was sucking up the juice. Since then he has obtained eight other specimens. As above mentioned (p. 420, n. 202), there may be found over a large area of forest only one pair of this strong-winged butterfly, which likes to keep to the higher trees, quite out of the reach of the net, but is fond of fæces and strong smelling things such as carrion, to which it is often attracted and caught. From Wallace's account of the capture of the type specimen of the species at Ayer-panas in Malacca it is known how closely this insect keeps to one place, even to the same tree. It was on the fourth day, after having missed it the three previous days, and on the very same tree, that Dr. Friedl Martin caught his first specimen at Aer Kesoengei in Asahan. *P. calydonia* settles with the head downwards on tree trunks, and makes while feeding the same rotating movements of the hindwings as is done by many *Lycænidæ*.

267. PROTHOE ANGELICA, Butler.

Grose Smith as *franckii*. Hagen as *frankii* [sic], Godardt [sic]. Wallace as *franckii*. Distant. Semper. The true *P. franckii*, Godart, is confined to Java. Occurs in Sumatra in the same localities and elevations as *P. calydonia*, Hewitson, but is not so rare; settles also on tree trunks with its head downwards.

Family LEMONIIDÆ.

Subfamily LIBYTHÆINÆ.

268. LIBYTHEA MYRRHA, Godart.

Hagen as *myrrha*, Godardt [sic]. Found in forest from Selesseh to Soengei Batoe, and is not very common. It is fond of settling with folded wings on wet sand on the banks of small streams.

269. LIBYTHEA NARINA, Godart.

The *L. rohini* of Marshall is a synonym of this species. Occurs in Sumatra near to the sea, as Dr. Martin obtained his first specimen near Kamborg-house between the Saentis and Mabar Estates in May, 1890. Found also at Selesseh, but does not extend higher than Namoe Oekor, and is very rare.

Subfamily NEMEOBIINÆ.

270. ZEMEROS ALBIPUNCTATA, Butler.

Hagen as *flegyas*. Staudinger. Distant.

271. ZEMEROS EMESOIDES, Felder.

Hewitson. Grose Smith as *Temeros* [sic] *emesoides*. Both species of *Zemeros* are found chiefly in forests on the flowers or red fruits of some shrub of medium height, on which they feed. They rest with half open wings. Both species are very delicate, and it is almost impossible to obtain a perfect example of either for the cabinet. *Z. albipunctata*, Butler, is much the commoner, and is spread over the whole of our area; whereas *Z. emesoides* is much rarer, does not occur near the sea, and is found from Selesseh to Bekantschan.

272. STIBOGES NYMPHIDIA, Butler.

Hagen. Found only on the Central Plateau, and is rare even there, as in all Dr. Martin has only obtained six specimens in thirteen years.

273. TAXILA THUISTO, Hewitson.

Hewitson. Hagen. Grose Smith. Distant. Rare in Deli, occurs in forests only from Selesseh to Bekantschan.

274. TAXILA HAQUINUS, Fabricius.

Hagen. Staudinger. Hewitson as *drupadi*. The "*Emesis*" *drupadi* of Horsfield, described from Java, is a synonym of this species. Very common in the forests of the plains, abounded in April and May, 1894, near Selesseh. Both the species of *Taxila* are fond of the same shrub frequented by the two species of *Zemeros*.

275. LAXITA DAMAJANTI, Felder.

Snellen. Staudinger as *tanita*. For remarks on *L. tanita*, Hewitson, see de Nicéville, Journ. A. S. B., vol. lxiii, pt. 2, p. 22 (1894). It appears that Staudinger's *tanita* = *damajanti*.

276. LAXITA LYCLENE, de Nicéville.

L. lyclene, de Nicéville, Journ. A. S. B., vol. lxiii, pt. 2, p. 21, n. 17, pl. ii, fig. 10, *male* (1894).

Hewitson as *telesia*. Hagen as *telesia*. Grose Smith as *telesia*. Staudinger as *telesia*. Kirby as *telesia*. Distant as *telesia*. This is a local race of *T. telesia*, Hewitson, from Borneo.

277. LAXITA ORPHNA, **Boisduval.**

Hewitson. Grose Smith. All the species of *Laxita* are of weak flight, and found in forests only. Owing to their very delicate structure and colours, perfect specimens are very scarce. *L. lyclene*, de Nicéville, is the commonest, and occurs in the plains, very plentiful near Selesseh together with *T. haquinus*, Fabricius. *L. damajanti*, Felder, is less common from Namoe Oekor to Bekantschan. *L. orphna* is decidedly rare, and is found from Bekantschan to the Central Plateau.

278. ABISARA SAVITRI, **Felder.**

Hewitson as *susa* and *savitri.* Hagen. Grose Smith as *susa.* Staudinger. The "*Sospita*" *susa* of Hewitson is a synonym of this species, and is so given by Hewitson himself.

279. ABISARA AITA, **de Nicéville.**

A. aita, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. viii, p. 49, n. 9, pl. L, fig. 10, *male* (1893).

HABITAT: N.-E. Sumatra.

EXPANSE: ♀, 2·15 inches.

DESCRIPTION: FEMALE, differs from the male in being slightly larger, the ground-colour of the UPPERSIDE of *both wings* is dull ferruginous instead of dull hair-brown, the two discal bands of the *forewing* are wider and more prominent, and the white area of the *hindwing* is rather larger. UNDERSIDE shews the same differences as are found on the upperside.

The two species of *Abisara* with tails are rare, and are somewhat stronger on the wing than the other species of the subfamily. *A. savitri*, Felder, belongs to the forests of the alluvial plain, whereas *A. aita* is only found at high elevations, from Soengei Batoe to the Central Plateau. Dr. Martin first received the latter from his Battak collectors in July, 1893.

280. ABISARA KAUSAMBI, **Felder.**

Hewitson. Hagen as *echerius*, var. *kausambi.* Butler as *Albisara* [sic] *kausambi.* Distant. A distinct species, the male of which has two pale bands crossing the disc of the forewing on the upperside, the outer of which is anteriorly developed into a somewhat broad whitish fascia. The hindwing on the upperside shews two apical and two anal black spots. It was originally described from the Malay Peninsula; I possess specimens from Perak, Jelebu and Singapore, also in the Malay Peninsula, and from Sumatra and Borneo.

281. ABISARA KAUSAMBIOIDES, de Nicéville, n. sp.

A. kausambi, Distant (*nec* Felder), Rhop. Malay, p. 189, n. 2, pl. xviii, fig. 10, *male* (1883).

HABITAT: Penang and Perak in the Malay Peninsula, N.-E. Sumatra, Nias.

EXPANSE: ♂, 1·8 to 1·9 inches.

DESCRIPTION: MALE. UPPERSIDE, *both wings* rich dark prune-coloured, beautifully glossed with dark purple in some lights, much more so than in either sex of *A. kausambi*, Felder; without markings. UNDERSIDE, *both wings* of the same rich prune-colour as on the upperside, but without purple reflections. *Forewing* with the usual pair of discal parallel narrow pale purplish lines, which widen out somewhat on nearing the costa; a narrow submarginal whitish line from the anal angle, becoming obsolete beyond the middle of the wing. *Hindwing* with the usual pale discal band, three apical and two anal black spots each bearing outwardly a fine white line, between these spots in the median interspaces are a pair of pale lunules, a submarginal narrow dark line, inwardly defined with a very fine white line.

I have described this species as new with some reluctance, as the butterflies of this group of the genus *Abisara* are obviously very variable, these variations being apparently not confined in some cases to geographical areas, so that the numerous names which have already been given to many of these varietal forms are by no means easy to allocate. There are, however, obviously two species of *Abisara* of this group occurring in the Malay Peninsula and N.-E. Sumatra, the males of both being easily separable. *A. kausambi*, Felder, is much ornamented with whitish bands and black spots on the upperside, while *A. kausambioides* is entirely plain and unmarked; the ground-colour of the latter is also much deeper. The females of the two species I am unable to differentiate. Mr. Distant's figure and description of the male quoted above evidently applies to the present species, and do not at all agree with Felder's description of the male of *A. kausambi.** *A. kausambioides* is perhaps nearest to *A. prunosa*, Moore, from Ceylon, but that species has the male normally ornamented with pale bands and black spots on the upperside. The two non-tailed *Abisaras* are not uncommon in N.-E. Sumatra, *A. kausambi* occurring near the sea (Loboe Dalam) to Namoe Oekor, while *A. kausambioides* is found from Namoe Oekor to Bekantschan. Both are of very delicate structure, and quickly get rubbed and worn. All the butterflies of the subfamily keep close to the ground, and rest with half-opened wings.

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* See the last paragraph on p. 324 of Butt. of India, vol. ii. When writing this I possessed but two male *Abisaras* of this group from the Malay Peninsula, one each represents *A. kausambi* and *A. kausambioides*: from this small material I did not dare to describe a new species.

Family LYCÆNIDÆ.

282. GERYDUS GIGANTES, de Nicéville.

G. gigantes, de Nicéville, Journ. A. S. B., vol. lxiii, pt. 2, p. 23, n. 19, pl. v, figs. 1, *male*; 13, *female* (1894).

Dr. Martin obtained the type of this species in October, 1892, from the mountains caught by the Battak collector Si-Ketjap, and later on Dr. Martin took several specimens himself at Namoe Oekor in August and November, so this fine and large species probably occurs from the latter place to the Central Plateau. On the wing it greatly resembles some species of *Pierinæ*, and will certainly when flying be always taken by collectors for an insect of that subfamily. It is found also in Penang, and is the largest and most distinct species in the genus. More than half the surface on the upperside in both sexes is pure chalky-white.

283. GERYDUS SYMETHUS, Cramer.

Grose Smith. Hagen. Occurs everywhere from near the sea to the elevation of Namoe Oekor, even near houses, in orchards, and in cocoa-nut plantations. It is common every year at Bindjei in November and December.

284. GERYDUS GALLUS, de Nicéville.

G. gallus, de Nicéville, Journ. A. S. B, vol. lxiii, pt. 2, p. 25, n. 21, pl. v, fig. 11, *female* (1894).

The figure of this species has not been well reproduced, the ochreous and ferruginous mottlings of the underside not being shewn at all. The white band on the upperside of the forewing is also shewn too narrow. It differs from *G. symethus*, Cramer, in many particulars, but chiefly in having no whitish colour within the oblique discal white band on the upperside of the forewing, whereas in *G. symethus* the base of the wing up to the discal band is bluish-grey instead of brown. It is rare near Selesseh, but is more plentiful in the lower hills and outer spurs of the mountains.

285. GERYDUS BIGGSII, Distant.

The *G. gopara*, de Nicéville, is probably the same species. It is nearly as common as *G. symethus*, Cramer, but is found at a higher elevation, from Namoe Oekor to Bekantschan.

286. GERYDUS ZINCKENII, Felder.

I possess one female example from Sumatra which agrees with typical Javan specimens of this species. It may be known by the white area of the forewing on the upperside occupying half the surface, its outer edge straight; in *G. symethus*, Cramer, and *G. gallus*, de Nicéville, the pure white area is much smaller, and is confined to the disc, not reaching the base of the wing, with its outer edge very irregular.

287. GERYDUS GÆTULUS, de Nicéville.

G. gætulus, de Nicéville, Journ. A. S. B., vol. lxiii, pt. 2, p. 24, n. 20, pl. v, fig. 12, *female* (1894).

On the upperside the forewing is precisely similar to that of *G. zinckenii*, Felder, but the hindwing differs in that instead of being dull fuscous throughout, half the surface is white, with a prominent fuscous disco-cellular line. On the underside it hardly differs from *G. biggsii*, Distant. It is rare, I have seen three females only taken in July and October near Bekantschan.

288. GERYDUS BOISDUVALI, Moore.

Very rare, I possess one female only from Sumatra, which is certainly this species.

289. GERYDUS GÆSA, de Nicéville.

G. gæsa, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. x, p. 26, n. 10, pl. S, fig. 16, *male* (1895).

May be known from all the described species in the genus by the upperside being immaculate in both sexes. The underside is very similar to that of *G. biggsii*, Distant. It is found from Bekantschan to the Central Plateau in January, March and July.

290. *GERYDUS ZYMNA, Doubleday and Hewitson.

Grose Smith as *Miletus zymna*. The type of the genus *Miletus* is "*Papilio*" *polycletus*, Linnæus, from the Moluccas. Mr. Druce has monographed the genus in Trans. Ent. Soc. Lond., 1891, p. 179, but unfortunately uses the name *Hypochrysops*, Felder, for it, of which "*Thecla*" *anacletus*, Felder, also from the Moluccas, has been fixed by Mr. Scudder as the type, and which species is congeneric with *Miletus polycletus*. I may note here that a female example of *M. cœlisparsus*, Butler, described from Nias Island, off the west coast of Sumatra, has been obtained on Penang Hill ("The Crag") by Mr. A. R. Adams, and will almost certainly be hereafter obtained in the island of

Sumatra which lies between Nias and Penang. I may remark also that I wrote blindly in Butt. of India, vol. iii, p 21, when I suggested that the genus *Miletus* belongs to the *Gerydus* group; at the time of writing I had seen no specimen of true *Miletus*. Previous writers had used *Miletus* and *Gerydus* for *symethus*, Cramer, which led me astray. "*Miletus*" *symna* would appear to be a true *Gerydus*, but as it was described from Ashanti, is not likely to be found also in Sumatra. The nearest Sumatran species to which it is superficially allied is *G. gætulus*, de Nicéville.

291. PARAGERYDUS HORSFIELDI, Moore.

Grose Smith as *horsfeldi* [sic]. Hagen. Very common everywhere over the whole of our area. Very variable in size, some females being much smaller than the average of males. Also variable in the coloration of the underside, some Sumatran specimens approach very closely to *P. taras*, Doherty, from Burma, but none of them have "the apex [of the forewing so] widely tinged with rufous-brown" as in that species.

292. PARAGERYDUS PANORMIS, Elwes.

Allotinus panormis, Elwes, Proc. Zool. Soc. Lond, 1892, p. 619, pl. xliii, figs. 8, *male*; 9, *female*.

Rare, but occurs at Bekantschan in February, August, September and November, so probably generation follows generation at short intervals. May be recognised at once by the apex of both wings on the underside being greatly infuscated. I have placed it in the genus *Paragerydus* rather than *Allotinus*, as it has the upper discoidal nervule of the forewing originating well beyond instead of at the apex of the discoidal cell.

293. PARAGERYDUS PÆTUS, de Nicéville.

P. pætus, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. ix, p. 269, n. 7. pl O, fig. 12, *male* (1895).

A very distinct species from Bekantschan and at higher elevations. Flies in February, March, and again in November.

294. PARAGERYDUS PORTUNUS, de Nicéville.

P. portunus, de Nicéville, Journ. A. S. B., vol. lxiii, pt. 2, p. 27, pl. v, fig. 14, *male* (1894).

The very dark colour of the underside will suffice to distinguish this species; Sumatran specimens are even darker than typical ones from Java, the ground-colour being pale ferruginous instead of pale ochreous, with dark ferruginous mottlings. Is commoner than the preceding species in May and September in the same localities. All species of *Gerydus* and *Paragerydus* are shade-loving butterflies, and never venture into the direct rays of the sun. With the exception of the three common species, *G. symethus*, Cramer, *G. biggsii*, Distant, and *P. horsfieldi*, Moore, they are only found in deep forest, mostly restlessly flying round the buds of not very high bushes. They are rather weak on the wing, but disappear immediately in the forest if pursued. Both genera can be instantly distinguished by the structure of the legs in both sexes, and both possess three or four minute whitish or ochreous spots on the costa of the forewing on the upperside. These are very prominent in *P. pætus*, de Nicéville, and *P. horsfieldi*, Moore, less so in *P. panormis*, Elwes, and just visible only in *P. portunus*, de Nicéville.

295. Allotinus nivalis, Druce.

Occurs throughout the year in forest near Selesseh, but is rather rare.

296. Allotinus alkamah, Distant.

Distant. Found from Namoe Ockor to the Central Plateau, but is always rare. I do not yet possess specimens of *A. subviolaceus*, Felder, from Java, to compare with Burmese, Malayan Peninsula and Sumatran specimens of *A. alkamah*. It is I think probable that the latter is only a synonym of the former.

297. Allotinus apus, de Nicéville.

A. apus, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. x, p. 27, n. 11, pl. S, fig. 17, *female* (1895).

Two female specimens only have been obtained at Bekantschan in February, 1894.

298. *Allotinus major, Felder.

Hagen. Originally described from Celebes. We have not seen any species from Sumatra agreeing with Felder's description and figure. It is probable that Dr. Hagen identified *A. apus*, de Nicéville, with this species, as superficially they are somewhat similar.

299. Logania malayica, Distant.

Originally described from Sungei Ujong in the Malay Peninsula.

300. Logania sriwa, Distant.

Originally described from Malacca in the Malay Peninsula.

301. LOGANIA MARMORATA, Moore.

Originally described from Elphinstone Island in the Mergui Archipelago of Lower Burma.

302. LOGANIA LUCA, de Nicéville.

L. luca, de Nicéville, Journ. A. S. B., vol. lxiii, pt 2, p. 28, n 24, pl. ii, fig. 13, *female* (1894).

Found in Burma (Rangoon, the Daunat Range and Ataran Valley in Tenasserim), in the Malay Peninsula (Perak), and in Sumatra. This is the species referred to by Doherty under *Logania massalia* in Journ. A. S. B., vol. lx, pt. 2, p. 37, n. 10 (1891), as being undescribed from Perak. The general colour of the ground on the underside is brownish-ochreous or pale ferruginous. The figure has been badly reproduced, as it shows the apex of the forewing far too acute.

303. LOGANIA MASSALIA, Doherty.

Described from Margherita in Upper Assam. I possess specimens from the Daunat Range in Tenasserim, Burma, from Singapore captured by Dr. Martin, and from Sumatra and Java. The ground-colour of the underside is quite different to that of *L. luca*, de Nicéville, being white speckled with blackish and ochreous, instead of pale ferruginous. The males of both these species have a small round white spot in the middle of the disc of the forewing on the upperside, the hindwing throughout concolorous with the forewing, both being dull purplish-fuscous. A list of the known species of the genus will be found in Journ. A. S. B., vol. lxiii, pt. 2, p. 29 (1894). The *Loganias* are true inhabitants of large forest, and fly like *Gerydus* round the buds of low bushes, but are decidedly quicker on the wing than they. *L. malayica*, Distant, and *L. sriwa*, Distant, occur all the year round in the forests of the plains, and do not go much higher than Namoe Oekor. Both species remind one when flying of a common lycænid, such as *Cyaniris* or *Catochrysops*. *L. marmorata*, Moore, *L. luca*, de Nicéville, and *L. massalia* are found at higher elevations beginning with Namoe Oekor, and occur mostly in the first months of the year, January and February. In 1893 and 1894 Dr. Martin caught a pair of *L. marmorata in coitû* in January in the forest south of Namoe Oekor. The white patch on the upperside of the forewing not reaching the base of the wing will at once separate *L. massalia* from *L. marmorata* and *L. luca*.

304. ZARONA PHARYGOIDES, de Nicéville.

Z. pharygoides, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. v, p. 208, pl. E, fig. 3, *male* (1890).

The type specimen was from Johore in the Malay Peninsula. Dr.

Martin obtained only two males of this rare species at Bekantschan in March and May.

305. PORITIA SUMATRÆ, Felder.

Felder. Butler. Grose Smith. Kirby. Distant. Originally described from Sumatra. A very distinct and easily recognised species which shews but little variation. Occurs in the Battak mountains.

306. PORITIA ERYCINOIDES, Felder.

Grose Smith. Hagen. Felder originally described and figured a male from Java, Hewitson described and figured the female as *P. phraatica* from Singapore, the latter being black on the upperside marked with orange. I have a good series of both sexes from Java, which agree with Sumatran ones from the Battak mountains.

307. PORITIA PLEURATA, Hewitson.

The type of this species was from Singapore. The male may be known from *P. erycinoides*, Felder, by having the apical half of the forewing on the upperside black and unmarked instead of heavily marked with blue. The female of *P. pleurata* is marked with blue in some lights, green in others. Occurs in Sumatra at Bekantschan.

308. PORITIA PROMULA, Hewitson.

Originally described from a female from Java. Dr. Martin possesses female specimens which agree very well with Hewitson's figures and description.

309. PORITIA PHILOTA, Hewitson.

Hewitson. Grose Smith. Kirby. Originally described from Sumatra, where it occurs at Selesseh and in the Battak mountains. It is found also at Pahang and Johore in the Malay Peninsula. The female is unknown. The male is easily distinguished by the very dark colour of the underside, Mr. Hewitson calls it "rufous-brown, undulated throughout with paler colour." I would describe the ground-colour as fuscous, the macular bands very close together, dark ferruginous in colour, outwardly defined with black.

310. PORITIA PLATENI, Staudinger.

P. plateni, Staudinger, Iris, vol. ii, p. 104, pl. i, fig. 8, *male* (1880).

Originally described from two males from Palawan in the Philippine Isles. It is a most distinct species, all the bands of the underside present in every *Poritia* are in this species broken up into well-separated spots. The *Poritias* in the male sex have perhaps on the upperside the most brilliant coloration of all the oriental *Lycænidæ.* They are forest animals, and appear very early in the day as soon as the sun has dried the leaves of the higher bushes or small trees, on which they settle for the sunny tropical forenoon, leaving their favourite perch for a high flight from time to time, but always returning to the same spot. They may be found on the wing before seven o'clock in the morning, but disappear at noon, after which hour they are never seen. In Sumatra *L. erycinoides*, Felder, and *L. pleurata*, Hewitson, are found in the plains, the other species are caught on the outer ranges of the hills from Namoe Oekor to Soengei Batoo. No species is really common, though *P. sumatræ*, Felder, and *P. philota*. Hewitson, are somewhat less rare than the others. They fly all the year round, but are more common from June to August. The females of all the species are very scarce and are seldom seen in collections. A Battak collector in Dr. Martin's service named Similir was particularly clever in getting *Poritias*, and obtained nearly all the specimens in Dr. Martin's collection. He asked for a pair of forceps to reverse without damage the wings of those specimens which died "inside out" as it is often the annoying habit of many small butterflies to do.

311. SIMISKINA PHALENA, Hewitson.

S. phalena, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. ix, p. 270, n. 8, pl. O, fig. 23, *female* (1895).

Originally described from a male from Singapore; it occurs also in the Patkoi Hills of Upper Assam (= *Massaga hartertii*, Doherty), the Katha District of Upper Burma, and in N.-E. Sumatra, taken at Toentoengan in the compound of Dr. Martin's house by Lieut. Ernst Hartert. I have described and figured the female. Dr. Martin obtained a second male specimen in May, 1894, from the Battak mountains.

312. SIMISKINA PHARYGE, Hewitson.

S. pharyge, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. vi, p. 361, n. 12, pl. F, fig. 11, *female* (1891).

Originally described from a male from Borneo, I figured and described the female. It occurs also at Perak and Penang in the Malay Peninsula; at Renong in Western Siam; and Herr M. Ude, Dr. H. Dohrn's collector, obtained a pair at Bohorok in Eastern Sumatra, in September, 1894.

313. SIMISKINA PAVONICA, de Nicéville.

S. pavonica, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. x, p. 28, n. 12, pl. S, fig. 18, *male* (1895).

Near to *S. pediada*, Hewitson, from Mergui in Lower Burma and from Singapore. Found in the Battak mountains of Sumatra very rarely.

314. SIMISKINA PROXIMA, de Nicéville.

S. proxima, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. x, p. 29, n. 13, pl. S, figs. 19, *male*; 20, *female* (1895).

Near to *S. potina*, Hewitson, from Burma and the Malay Peninsula. A single pair of this species is in Dr. Martin's collection, the male obtained by Herr Udo at Bohorok in Eastern Sumatra in September.

315. SIMISKINA PROCOTES, de Nicéville.

S. procotes, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. x, p. 32, n. 14, pl. S, fig 21, *female* (1895).

Near to *S. potina*, Hewitson, from Burma and the Malay Peninsula. Described from a single female taken in July at Bekantschan. The remarks regarding *Poritia* given above apply equally well to the genus *Simiskina*. With the exception of *S. proxima*, de Nicéville, of which Dr. Martin took a female in April, 1890, very near the sea at the Saentis Estate, all occur in the outer mountains higher than Namoe Oekor. All the species are very rare, but appear to occur more frequently from June to August.

316. PITHECOPS HYLAX, Fabricius.

Snellen as *Plebejus* [sic] *hylax*. Hagen. Staudinger. In large forest, also wherever a small piece of jungle is left in young forest, will *P. hylax* be found flying so quickly that the eye of the collector cannot always follow the little animal. In shadow it is soon lost to view, but becomes visible again when passing one of the errant sunbeams of the forest. It prefers low elevations and occurs throughout the year.

317. PITHECOPS MARIÆ, de Nicéville.

P. mariæ, de Nicéville, Journ. A. S. B., vol. lxiii, pt. 2, p. 30, n. 26, pl. iv, figs. 2, *male*; 9, *female* (1894).

Occurs from Namoe Oekor to the Central Plateau where *P. hylax*, Fabricius, is no longer found. Dr. Martin obtained the types in September, 1893, from Bekantschan. It is nearly allied to, but quite distinct from, *P. fulgens*, Doherty, from Margherita in Upper Assam, the only other species in the genus yet known which has the male of a brilliant blue on the upperside. When flying in the sun it looks like a sapphire taken to wings.

318. *PITHECOPS DIONISIUS, Boisduval.

Grose Smith. This species is, as far as I know, confined to the Papuan region.

319. UNA USTA, Distant.

HABITAT: Cachar; Myitta and the Daunat Range, Tenasserim, Burma; the Malay Peninsula; N.-E. Sumatra.

EXPANSE: ♀, ·95 of an inch.

DESCRIPTION: FEMALE. UPPERSIDE, *forewing* with the costa, apex, and outer margin broadly brown, the posterior half of the discoidal cell to the inner margin delicate cerulean-blue, which becomes slightly darker towards the base of the wing. *Hindwing* brown, with the exception of a linear spot in the outer half of the discoidal cell, which is covered with bluish scales. UNDERSIDE, *both wings* as in the male, only somewhat paler. *Cilia* grey-brown. *Abdomen* on the underside yellowish-white.

Found in Sumatra at Bekantschan and in the Battak mountains from whence the unique female described above in Dr. Martin's collection was captured in December, 1894. It is never common, but is more plentiful on the river banks at Soeugei Batoo in August and September than elsewhere.

320. NEOPITHECOPS ZALMORA, Butler.

To the synonyms of this species already given in Butt. India, vol. iii, p. 53 (*Pithecops dharma*, Moore; *Parapithecops gaura*, Moore; and *Neopithecops horsfieldi*, Distant), may now be added *Cupido talmora* Druce, Proc. Zool. Soc. Lond., 1873, p. 348, n. 4, from Borneo (this species appears to be a MS. name of Mr. Butler's which was never published), and *Plebeius lucifer*, Röber, Iris, vol. i, p. 61, pl. iv, fig. 5 (1888), from the Aru and Key Isles, of which Herr Röber has kindly sent me a specimen from Aru. In Sumatra it is found over our whole area, in the plains (Stabat) and in the mountains (Bekantschan), but is never as common as *P. hylax*, Fabricius. The female, says Dr. Martin, possesses on the upperside of the forewing beyond the discoidal cell a faint blue patch similar to that in the same sex of *P. mariæ*, de Nicéville.

321. SPALGIS NUBILUS, Moore.

Originally described from the Andaman Isles. It may be known from the common Indian and Ceylonese *S. epius*, Westwood, by the discal spot on the upperside of the forewing in the male being ochreous instead of whitish; the female of *S. nubilus* is marked like the male, in *S. epius* the female has the disc of both wings on the upperside more or less whitish. *S. nubilus* is also found in Burma, Java, and Borneo. Mr Moore has incorrectly recorded *S. epius* from Mergui, Lower Burma, the species should be *S. nubilus*, which occurs in Burma as far north as Chittagong. In Sumatra it is very rare, Dr. Martin has only seen three specimens during his long stay in the island, two taken in October in the forest near Namoe Oekor, and one in forest near Selesseh in January. Perhaps *S. nubilus* escapes being caught by its small size and dull coloration, and by its resemblance to the common *Parägerydus horsfieldi*, Moore.

322. TARAKA HAMADA, Druce.

Rare, found only at higher elevations south of Bekantschan and Soengei Batoe.

323. TARAKA MAHANETRA, Doherty.

Originally described from Padang Rengas, Perak, in the Malay Peninsula. Excessively rare, and found in Sumatra only in the deepest forest. Dr. Martin possesses three specimens, a male from near Selesseh taken in June; and a pair from Bekantschan, the male taken in September, the female in July.

324. MEGISBA MALAYA, Horsfield.

Snellen as *Plebejus* [sic] *malaya.* Hagen. The Sumatran form is typical, the hindwing being tailed. It is not common, but is found all over our area. The males may be captured on small puddles on the forest roads; the females are very rare, and are only met with singly in the forest on flowers and shrubs. Found in Namoe Oekor from July to September.

325. CYANIRIS AKASA, Horsfield.

Grose Smith. Hagen. Not uncommon in the Battak mountains.

326. CYANIRIS COSSÆA, de Nicéville.

C. cossæa, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. ix, p. 271, n. 9, pl. O, figs. 14, *male*; 15, *female* (1895).

Occurs at Namoe Oekor commonly.

327. CYANIRIS CORYTHUS, de Nicéville.

C. corythus, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. ix, p. 273, n. 10, pl. O, figs. 16, *male*; 17, *female* (1895).

Not rare in the Battak mountains in September and December.

328. CYANIRIS PUSPA, Horsfield.

Hagen as *cagaja* [sic]. Snellen as *cagaya.* Sumatran specimens have the merest trace of white sprinkling on the upperside of both wings in the male, thereby agreeing with *C. lambi*, Distant, from the Malay Peninsula and Nias, and *C. cagaya*, Felder, from the Philippines. I cannot, however, regard *C. lambi* as anything but a synonym of *C. puspa*, that species being very variable, and in the Himalayas embracing a form inseparable from *C. lambi*. *C. cagaya*, Felder, as figured, has the black border to both wings on the upperside somewhat narrower than in Javan specimens of *C. puspa*, from whence it was first described.

329. CYANIRIS CARNA, de Nicéville.

C. carna, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. ix, p. 274, n. 11, pl. O, fig. 18, *male* (1895).

The rarest of all the Sumatran species of the genus. "The infuscation of the costa and apex of the forewing on the underside" is not always present, but the other characters given in the description will suffice to distinguish this species from its allies.

330. CYANIRIS MUSINA, Snellen.

C. musina, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. ix, p. 275, n. 12, pl. O, fig. 19, *male* (1895).

A very common species in Sumatra. I have not been able to obtain typical specimens of this species from Java to compare with Sumatran examples.

331. CYANIRIS PLACIDA, de Nicéville.

Not very common in Sumatra.

332. CYANIRIS CAMENÆ, de Nicéville.

C. camenæ, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. ix, p. 278, n. 14, pl. O, fig. 22, *male* (1895).

The commonest species of the genus occurring in Sumatra.

333. CYANIRIS LIMBATUS, Moore.

Also common.

334. CYANIRIS MELÆNA, Doherty.

Originally described from the Tenasserim Valley, Burma. Very rare in Sumatra, Dr. Martin has obtained two or three specimens only in the Battak mountains. Of the ten Sumatran species of *Cyaniris*, only two occur in the plains, *C. cossæa*, de Nicéville, and *C. puspa*, Horsfield, all the others are found in the mountains at high elevations from Soengei Batoe to the Central Plateau, and on the Plateau itself. *C. akasa*, Horsfield, and *C. corythus*, de Nicéville, are somewhat scarce, *O. carna*, de Nicéville, and *O. melæna*, Doherty, are very rare, whilst the four remaining species are very common and brought in by the collectors in large numbers. The males only are caught on wet spots on roads and on the sandy banks of small hill streams; the very scarce females can only be taken in the forest, where they are looking for and ovipositing on the food-plants of the larvæ, or feeding on the flowers of certain *Compositæ.*

335. *CYANIRIS HARALDUS, Fabricius.

Grose Smith as *Lycænopsis ananga.* Distant. Butler. Kirby as *haraldus* and *ananga.* I have never seen this very rare species. Its record from Sumatra is probably correct, so striking a butterfly is not likely to have been wrongly identified. The *Lycænopsis ananga* of Felder is a synonym of *C. haraldus.* I think it probable that the genus *Lycænopsis* is valid, at any rate the type species is a very different-looking animal to all the species of *Cyaniris* known to me.

336. ZIZERA LYSIMON, Hübner.

Hagen as *karsandra.*

337. ZIZERA GAIKA, Trimen.

The rarest species of the genus occurring in Sumatra as elsewhere.

338. ZIZERA OTIS, Fabricius.

Snellen as *lysizone.* Hagen as *lysizone.* All the three *Zizeras* frequent only open grassy spots, and are found near houses and on fallow land. *Z. lysimon*, Hübner, is very common in the plains, and is nearly ubiquitous, especially so on the flowers of a wild species of thorny *Spinacia* (*Amarantus spinosus*, Linnæus), and on the small yellow flowers of a very common species of *Portulaca.* *Z. gaika*, Trimen (named after a Zulu chief, so Mr. Trimen informs me) is found in the same localities, but is very rare; Dr. Martin took it in his garden at Bindjei. *Z. otis* is found on the Central Plateau, and near Battak villages in the mountains.

339. AZANUS ASIALIS, de Nicéville.

A. asialis, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. x, p. 33, n. 15, pl. S, fig. 22, *male* (1895).

Described from a single example caught in the Battak mountains in July, 1894.

340. LYCÆNESTHES EMOLUS, Godart.

Hagen as *Pseudodypsas* [sic] *bengalensis.*

341. **Lycænesthes lycænina**, Felder.

Both species of this genus inhabit the plains, and do not occur at the higher elevations. They are common in May near Selesseh on forest roads. *L. lycænina* is the rarer of the two species, and Dr. Martin obtained no female of either.

342. **Niphanda tessellata**, Moore.

Habitat: Penang, Malay Peninsula; N.-E. Sumatra.

Expanse: ♂, 1·5 inches.

* Description: Male. Upperside, *both wings* dark shining purple, with a narrow anteciliary black thread. *Hindwing* with a round marginal black spot in the first median interspace. Underside, *both wings* marked as in the female, but the ground-colour much darker.

The specimen described above was caught by Dr. Martin in his fingers on the Penang Hill in December, 1892, resting on a flower. In Sumatra he has obtained one female at the Saentis Estate, very near the sea, in April, and a second at Namoe Oekor in August.

343. **Everes argiades**, Pallas.

Snellen as *parrhasius*. Hagen as *parrhasius*. It has been described by Herr N. Kheil from Nias as *Plebeius polysperchinus*. In Sumatra it is common at low elevations in October and November; as usual the males on roads, the females on flowers in small jungle. In his valuable work on the *Rhopalocera* of Nias Island, Herr Kheil calls *Polyommatus bœticus*, Linnæus, the "*cardui*" of the *Lycænidæ*, but *E. argiades* better deserves that epithet as it has a still greater range, occurring in North America under a slightly modified form (as *E. comyntas*, Godart), which *P. bœticus* does not do. Dr. Martin notes that European specimens of *E. argiades* have the spots on the underside of the wings somewhat more prominent than in Sumatran examples.

344. **Nacaduba macrophthalma**, Felder.

Originally described from Pulo Milu, one of the Nicobar Isles.

345. **Nacaduba pavana**, Horsfield.

Originally described from Java.

346. **Nacaduba kerriana**, Distant.

Originally described from Malacca and Singapore, occurs also in Burma.

347. **Nacaduba** sp.

I possess a single female of a species allied to this group, *i.e.*, it has the basal area of the forewing on the underside unmarked, while all the species of *Nacaduba* enumerated below have an additional basal striga, while all those above named lack this striga; but as the females of all of them are known, the present species cannot appertain to any of them. I refrain from describing it until I have obtained the opposite sex.

348. **NACADUBA ATRATA**, Horsfield.

Grose Smith. This species = *N. prominens*, Moore.

349. **NACADUBA HERMUS**, Felder.

This species = *N. viola*, Moore, = *P. unicolar*, Röber, Iris, vol. i, p. 66, pl. v, fig. 4, *male* (1888), described from East Celebes, Ceram, and the Key Islands, of which Herr Röber has sent me a male from Ceram.

350. **NACADUBA ANCYRA**, Felder.

HABITAT: Amboina (*Felder*); East Pegu (*Elwes*); East and South Celebes, the Aru Isles, Ceram (*Röber*); Palawan; Batjan; Celebes; Cooktown, N.-E. Australia (*Staudinger*); Philippine Isles (*Semper*); S.-E. Borneo, Java, Engano, ? Nicobar Isles (*Doherty*); N.-E. Sumatra; Celebes, Yamna, near Humboldt's Bay, North New Guinea (*coll. de Nicéville*).

EXPANSE: ♀, 1·2 inches.

DESCRIPTION: FEMALE. UPPERSIDE, *forewing* plumbeous; with a large metallic iridescent silvery-blue discal area, which reaches into the posterior half of the discoidal cell, and occupies the base and inner margin of the wing. *Hindwing* plumbeous, but the basal two-thirds overlaid with blue scales; the veins defined with black; the outer margin has a broad black border with its inner edge lunulated between the veins, bearing a series of marginal black spots between the veins, each spot outwardly defined by a fine anteciliary thread, inwardly by a white lunule, except the two larger anal spots which are inwardly crowned with ferruginous; a very fine black anteciliary thread. UNDERSIDE, *both wings* as in the male. *Cilia* white. *Tail* black, tipped with white.

Described from a single example from Sumatra. It has all the appearance of a female of the genus *Catochrysops*, to which genus this species bears a strong superficial resemblance. It has several synonyms, *Nacaduba aberrans*, Elwes, Proc. Zool. Soc. Lond., 1892, p. 626, pl. xliv, fig. 6, *male*; *Plebeius subfestivus*, Röber, Iris, vol. i, p. 64, pl. iv, fig. 33, *male* (1888); *Nacaduba pseutis*, Doherty, Journ. A. S. B., vol. lx, pt. 2, p. 182 (1891); and Dr. O. Staudinger and Herr Georg Semper both suggest that the *Cupido almora* of Druce, Proc. Zool. Soc. Lond., 1873, p. 349, n. 14, pl. xxxii, fig. 7, *male*, from Borneo, is also a synonym, which is probably correct, but I cannot say for certain, as the upperside is alone figured and that very badly, while the description of the underside "Very pale brown, streaked and mottled with white. Hindwing with two black spots at the anal angle as above" is quite inadequate to distinguish the species.

351. **NACADUBA NANDA**, de Nicéville.

N. nanda, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. x, p. 34, n. 16, pl. S, fig 23, *male* (1895).

352. **NACADUBA NELIDES**, de Nicéville.

N. nelides, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. ix, p. 280, n. 16, pl. O, fig. 24, *male* (1895).

353. **NACADUBA NOREIA**, Felder.

Hagen as *nora*. The *Lycæna nora*, of Felder, from Amboina, has tails, and almost certainly equals *N. ardates*, Moore. *N. noreia* is typically tailless, and was described from Ceylon from a female. I have seen the type at Vienna, and it is what I have called the tailless form of *N. ardates*. *N. noreia* occurs typically in Sumatra. What I consider to be its female, and of which we possess many specimens (all of them to my eyes are obviously females, though Dr. Martin disputes the fact, as he says he has taken them sucking up moisture on damp spots on the roads, a habit quite unknown to female *Lycænidæ*, being confined to the males), is very curiously marked on the underside, having the ground-colour ochreous-yellow or luteous, in both wings with a very prominent marginal series of black spots, those in the forewing of equal size throughout, in the hindwing counting from anteriorly backwards the first and the sixth larger than the rest; within this series of spots is another submarginal obscure fuscous series; no basal or discal markings to both wings whatever. Dr. Martin proposes to call this "species" *Nacaduba lutea*, and has described it in a paper published in Munich entitled "Einige neue Tagschmetterlinge von Nordost-Sumatra, pt. 1, p. 1, n. 1 (1895), and I have figured it from a female in Journ. Bomb. Nat. Hist. Soc., vol. x, pl. S, fig. 24 (1895). In Sumatra also occurs typical *N. ardates*, which is tailed. This I hold to be a dimorphic form in both sexes of *N. noreia*. Its female is most variable, some forms of it from Burma in my collection being marked almost exactly as in *N. lutea*, Martin, the basal and discal markings being almost obliterated. I have not seen any females of true *N. ardates* with tails from Sumatra. The *Plebeius kupu*, Kheil, from Nias = *N. ardates*, Moore.

354. **NACADUBA DANA**, de Nicéville.

If the species of *Cyaniris* are more restricted to higher elevations, the greater number of *Nacadubas* occur in the plains at low elevations. From the Central Plateau *N. nelides*, de Nicéville, alone occurs, while *N. pavana*, Horsfield, and *N. atrata*, Horsfield, are found on the outer hills. All the other species occur in the plains. *N. macrophthalma*, Felder, *N. kerriana*, Distant, *N. nanda*, de Nicéville, *N. nelides*, de Nicéville, and *N. dana* are rare, the rest are more or less common. All *Nacadubas* are very fond of water, the males are usually captured sucking up this element on damp spots; the females are rare in all the species, and never come to water.

355. *NACADUBA PERUSIA, Felder.

Snellen. Originally described from Amboina. It is quite probable I think that this species will be found to be a synonym of *N. atrata*, Horsfield, which species appears to have been unknown to Dr. Felder.

356. JAMIDES SIRAHA, Kheil.

Plebeius siraha, Kheil, Rhop. Nias, p. 30, n. 91, pl. v, fig. 35, *male* (1884).

Snellen as *Plebejus* [sic] *plato*. Hagen as *bochus*. Originally described from Nias. It is a very distinct species, the male having the lovely metallic steel-blue coloration on the upperside of the forewing reduced to less than half the surface; in *J. bochus*, Cramer, from India and Ceylon, that colour occupies more than two-thirds the surface. *J. siraha* is figured by Distant in Rhop. Malay., p. 222, n. 1, pl. xxi, figs. 19, *male*; 16, *female* (1884), as *J. bochus*, var., from Province Wellesley. In Sumatra it is found all over our area, but is rare everywhere. Dr. Martin has specimens taken in February, April, October and November, and he caught a male at the door of his hospital at Bindjei on a flowering creeper (*Pharbitis nil*, Chois.),

357. LAMPIDES CELENO, Cramer.

Snellen as *celeno* and *agnata*. Grose Smith. Hagen as *celeno* and *malaccanus*. This species is better known under the name of *L. ælianus*, Fabricius. The *L. malaccanus* of Röber, and *L. agnata* of Druce are both synonyms.

358. LAMPIDES CLEODUS, Felder.

Originally described from Luzon in the Philippine Isles. *L. pura*, Moore, described from the Mergui Archipelago in Lower Burma, but which occurs also in Assam, Upper Burma, and Nias Island, is a synonym of *L. cleodus*. In Sumatra it is found at Selesseh and in the Battak mountains.

359. LAMPIDES SATURATA, Snellen.

Lycæna saturata, Snellen, Tijd. voor Ent., vol. xxxv, p. 137, n. 3 (1892).

Originally described from Java, but not figured. I am not quite sure of the identification, it is difficult to identify species of this genus without good figures. It is one of the commonest species of *Lampides* in the Malay Peninsula, Sumatra, and Java; I possess a very long suite of specimens of it from all these places.

360. LAMPIDES TALINGA, Kheil.

Plebeius talinga, Kheil, Rhop. Nias, p. 29, n. 86, pl. v, figs. 32, *male*; 33, *female* (1884).

Lampides talinga, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. x, p. 39, n. 18, pl. S, figs. 27, *male*; 28, *female* (1895).

A very small and quite distinct species. Originally described from Nias, and is very common in Sumatra.

361. LAMPIDES ELPIS, Godart.

Snellen. Hagen as *elphis* [sic], Godardt [sic].

362. *LAMPIDES KANKENA, Felder.

Snellen. Originally described from Kar Nicobar. I have seen the type specimen, a male, at Vienna. In the Indian Museum, Calcutta, are a pair of specimens from Nankowri, one of the Nicobar Islands, and I possess males from Nias Island and the Philippines. Its occurrence in Sumatra is not at all improbable. It is a very distinct species, has the striæ on the underside arranged as in *L. elpis*, Godart; the male on the upperside is of a very pale silvery-blue.

363. LAMPIDES KONDULANA, Felder.

Originally described from Kondul Isle, one of the Nicobars. I have seen the type in Vienna. In coloration the male is similar to that sex of the three preceding species, but the black border to the wings on the upperside is reduced to a marginal thread. On the underside the striæ are as in the two last-named species. I possess specimens from Nacondam Island, the Nicobar Isles, Burma, the Malay Peninsula, Sumatra and Java. The "*Cupido*" *cærulea*, Druce, from Borneo, Proc. Zool. Soc. Lond., 1873, p. 349, n. 13, pl. xxxii, fig. 6, *male*, is almost certainly a synonym of this species.

364. LAMPIDES SUBDITA, Moore.

First described from Mergui in Lower Burma. Is not uncommon in Sumatra at Namoe Oekor and in the Battak mountains.

365. LAMPIDES MARGARITA, Martin.

L. margarita, Martin, Einige neue Tagschmetterlinge von Nordost-Sumatra, pt. 2, p. 9, n. 8 (1895).

Occurs very rarely at Bekantschan and in the Battak mountains.

366. *LAMPIDES SUIDAS, Felder.

Hagen. Originally described from Luzon in the Philippines, from whence I possess specimens. We have not obtained it in Sumatra.

367. LAMPIDES BOCHIDES, de Nicéville.

L bochides, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. vi, p. 367, n. 16, pl. F, fig. 15, *male* (1891).

Rare, has been obtained at Selesseh and in the Battak mountains.

368. LAMPIDES ABDUL, Distant.

Very rare in the Battak mountains. Originally described from a unique female from Malacca in Dr. O. Staudinger's collection, which I have examined at Dresden. The male, which is of a peculiar shade of metallic green on the upperside, is the *L. marakata* of Doherty, described from Padang Rangas, Perak, Malay Peninsula, in Butt. India, vol. iii, p. 174 (1890).

369. LAMPIDES LUCIDE, de Nicéville.

L. lucide, de Nicéville, Journ. A. S. B., vol. lxiii, pt. 2, p. 33, n. 29, pl. v, fig. 3, *male* (1894).

Excessively rare, Dr. Martin has only obtained a few specimens in the Battak mountains, of which four males are in my collection. All the Sumatran *Lampides*, with the exception of one species, are true forest butterflies, which greatly enliven and cheer the gloomy evergreen primeval forests by the vivid and brilliant coloration of their wings. So perhaps they to some extent compensate for the observed poverty of blue flowers in the forest which has been noted by many writers. *L. celeno*, Cramer, like species of *Nacaduba*, *Catochrysops*, *Everes* and many other *Lycænidæ*, is found on wet spots on the roads. *L. lucide*, the most distinct of the Sumatran *Lampides*, occurs only on the Central Plateau. *L. margarita*, Martin, *L. bochides*, de Nicéville, and *L. abdul* [*recte abdula*, and so given in the Index to the plates of Mr. Distant's book] are found at higher elevations, from Bekantschan to the Plateau; while the remaining species are inhabitants of the forests of the alluvial plain. *L. celeno*, *L. saturata*, Snellen, *L. talinga*, Kheil, *L. elpis*, Godart, and *L. kondulana*, Felder, are common; *L subdita*, Moore, *L. cleodus*, Felder, and *L. bochides* are scarce; while *L. margarita*, *L. abdul*, and *L. lucide* are very rare.

All the *Lampides* are very restless and quick on the wing, and never settle for a long time, consequently from the denseness of the plant-growth in the forest are not easily captured.

370. CATOCHRYSOPS STRABO, Fabricius.

Hagen as *strabo*, Fabricus [sic] and *kandarpa*. Staudinger as *kandarpa*. The *C. kandarpa* of Horsfield is a synonym of *C. strabo*.

371. CATOCHRYSOPS LITHARGYRIA, Moore.

First described from Ceylon, but found also in Assam, Burma, the Andaman Isles, and the Philippine Isles.

372. CATOCHRYSOPS CNEJUS, Fabricius.

Snellen. The three species of *Catochrysops* in Sumatra occur at the lower elevations, and are not found higher than Bekantschan. The males of *C. strabo*, Fabricius, and *C. lithargyria*, Moore, are very common on roads, where they act as miniature scavengers, but the females must be sought for in gardens or small jungle. The males of *C. strabo* in particular occur in large numbers, thirty to fifty specimens, on the margins of puddles, and form beautiful violet patches of colour on the sunny roads. *C. lithargyria* is a little rarer than *C. strabo*, and may be considered to be a good species, Dr. Martin noting that he possesses females probably of this species which differ slightly in the shade of blue on the upperside of both wings from undoubted females of *C. strabo*. *C. cnejus* is quite as common as *C. strabo*, but is seldom found on roads as it prefers gardens in which the common Chinese bean (*Vigna sinensis*, Savi.) is cultivated, on the flowers of which the larva feeds. The figures of *C. strabo* and *C. cnejus* in Distant's Rhop. Malay. are not good, being far too reddish in shade on the upperside. The widely distributed *C. pandava*, Horsfield, which is common at Singapore, and is the most plentiful of all the Nicobarese butterflies, is strangely enough apparently absent from Sumatra.

373. CASTALIUS ROSIMON, Fabricius.

Grose Smith. Hagen.

374. CASTALIUS ANANDA, de Nicéville.

First described from Sikhim, occurs also in Assam, Upper Burma, Orissa, and South India.

375. CASTALIUS ETHION, Doubleday and Hewitson.

Grose Smith. Snellen. Hagen. Distant.

376. CASTALIUS ROXUS, Godart.

Hagen as *roxus*, Godardt [sic]. Staudinger.

377. CASTALIUS ELNA, Hewitson.

Widely distributed, found in North-Eastern and Southern India, Burma, the Andaman Isles, the Malay Peninsula, and Java. *C. rosimon*, Fabricius, *C. ethion*, Doubleday and Hewitson. *C. roxus*, Godart, and *C. elna* occur in the plains and outer hills south of Bekantschan and Bohorok. *C. rosimon*, *C. roxus*, and *C. elna* are found on roads and grassy places such as forest tracts overgrown with high grass, and settle with folded wings on the ground if moist, or on the tops of flowering *Gramineæ*. *C. ethion* keeps more to low shrubs, and is found inside the forest. *C. ananda*, de Nicéville, is only found in the forest on certain bushes in February and March. Dr. Martin took it, also in March and April, at Singla below Darjiling in the Western Himalayas only on certain trees, but I have caught the male in the same place on the wet sand in the beds of streams. The female of *C. ethion*, which has no blue coloration on the upperside of both wings, is so far quite similar to the male of *C. roxus*, our most common species, but the markings of the underside will instantly distinguish them. *C. elna*, the largest of our *Castalius*, is decidedly rarer than *C. rosimon*, *C. ethion*, and *C. roxus*; *C. ananda* is the rarest of all, and found only at the higher elevations.

378. POLYOMMATUS BŒTICUS, Linnæus.

Snellen. Hagen. Distant as *bæticus* [sic]. This widely-spread butterfly occurs in Sumatra near the sea, as Dr. Martin has taken it at the Saentis Estate and at Loboe Dalam on the flowers of the common kidney bean (*Phaseolus vulgaris*, Linnæus), and also very high in the mountains at Soengei Batoe and on the Central Plateau, but it is never found in the intermediate area. Dr. Martin is quite unable to account for this fact, which has also been observed by Dr. Hagen, who has taken *P. bœticus* near Laboean on abandoned Indigo plants, and believes that the butterfly was imported to this very low elevation from Singapore when the Malays first introduced the Indigo plant from thence.

379. *CUPIDO ÆTHERIALIS, var.

Hagen. I am unable to trace this species.

380. *LYCÆNA AUGUSTA.

Grose Smith. I have failed to discover this species also.

381. *LYCÆNOPSIS CYLINDE, Boisduval.

Grose Smith. Originally described from Dorei, New Guinea. Unless the type of this species still exists in M. Charles Oberthür's collection, it will be impossible to identify it from Boisduval's short description.

382. AMBLYPODIA NARADA, Horsfield.

Hagen. Grose Smith as *anita*. The *A. anita* of Hewitson was originally described from Siam, and is the common Indian and Ceylonese species. The coloration of the male on the upperside of both wings is more purple than blue, and it is not found south of Burma. *A. narada* is rich deep blue, and occurs in the Malay Peninsula. In Sumatra it is by no means common in the forests of the plains, and Dr. Martin possesses other specimens from Asahan and Indragiri. Dr. Martin notes that he has some very small examples of both sexes with a broader brown margin to the upperside of the forewing, and the markings of both wings on the underside more prominent, than in typical specimens.

383. IRAOTA ROCHANA, Horsfield.

Originally described from Java. The *I. boswelliana* of Distant, described from Penang and Singapore, is a synonym of this species. Dr. Martin remarks that the male has three tails. As figured by Horsfield and Moore in Cat. Lep. Mus. E. I. C., vol. i, p. 44, n. 68, pl. i*a*, fig. 10, *male* (1857), there are only two.

384. IRAOTA NILA, Distant.

HABITAT: Malacca (*Distant*); N.-E. Sumatra.

EXPANSE: ♂, 1·4 to 1·6 inches.

DESCRIPTION: MALE. UPPERSIDE, *both wings* black, with rich purple markings. *Forewing* with a streak occupying the middle of the discoidal cell for its whole length; two short streaks in the median interspaces, a very large one in the submedian interspace bisected by the submedian fold, not reaching the outer margin; a short streak at the base of the sutural area. *Hindwing* with the disc purple divided by the black veins; the costa and abdominal margin rather broadly pale fuscous; *tails* two, of equal length, short, narrow, black tipped with white. UNDERSIDE, *both wings* coloured and marked as in the female. *Antennæ* black, the tip of the club above gamboge-yellow, beneath also of the same colour, but gradually merging into the ferruginous colour of the middle and base of the club. *Head* with two white lines across the face, the orbits white. *Palpi* with the apex black, the base white. *Abdomen* above black, beneath whitish.

After all, this species turns out to be a true *Iraota*, though it is somewhat aberrant, as both sexes have two tails (in *I. rochana* the male has two [Dr. Martin says three] and the female three tails; in *I. timoleon*, Stoll, and allies the male has one and the female two tails), and the shape of the wing differs also somewhat from typical *Iraotas* in both sexes. The neuration, however, is quite normal. In Sumatra both the species of *Iraota* are rare, the males even more so than the females. Dr. Martin took the first male of *I. rochana*, Horsfield, a very large specimen, measuring 1·7 inches, at Namoe Oekor in August, 1892, and the first male of *I. nila* near Bekantschan in October, 1893. We have other specimens taken at Selesseh in July, and in the Battak mountains in September.

385. SURENDRA AMISENA, Hewitson.

Grose Smith. Hagen.

386. SURENDRA FLORIMEL, Doherty.

Originally described from Lower Burma.

387. *SURENDRA VIVARNA, Horsfield.

Hagen. Originally described from Java, from whence I have a good series of both sexes. *S. amisena*, Hewitson, and *S. florimel*, Doherty, both occur at low elevations in the forests of the plains, the former is very common near Selesseh, the latter much rarer. The males of the two species must be differentiated by the markings of the underside of the wings. In habits they resemble those of the following genus.

388. ARRHOPALA CENTAURUS, Fabricius.

Butler. Distant. Occurs in the sultanate of Indragiri.

389. ARRHOPALA AGNIS, Felder.

Grose Smith. Hagen. The shade of coloration of the upperside of the male is more variable in this species than in any other known to me; in some specimens it is almost pale blue, and there is nearly every gradation to be met with till deep purple is reached completing the series. It is a common species, and is found in Burma, the Malay Peninsula, and Nias; in Sumatra it occurs at Selesseh and in the Battak mountains.

390. ARRHOPALA ACE, de Nicéville.

A. ace, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. vii, p. 329, n. 6, pl. H, fig. 13, *male* (1892).

Originally described from Perak in the Malay Peninsula. I possess a single example from the Battak mountains of Sumatra. It is a very distinct and easily recognised species.

391. **ARRHOPALA ADOREA**, de Nicéville.

A common species at Bekantschan and in the hills.

392. **ARRHOPALA ATOSIA**, Hewitson.

Hewitson. Hagen. Grose Smith. Butler. Kirby. Distant. Originally described from Sumatra. A common and easily recognised species.

393. **ARRHOPALA AMPHEA**, Felder.

Originally described from Luzon in the Philippines. It is near to *A. abseus*, Hewitson, but the male may be known from the same sex of that species by having the purple coloration of both wings on the upperside nearly twice as extensive.

394. **ARRHOPALA AROA**, Hewitson.

Hewitson. Grose Smith. Butler. Kirby. Distant. Originally described from Sumatra, and is probably the commonest species of the genus found in the island.

395. ***ARRHOPALA ATRAX**, Hewitson.

Grose Smith. Probably incorrectly identified, as it is strictly confined to India as far as I am aware.

396. **ARRHOPALA ADATHA**, Hewitson.

A fairly common species in Sumatra.

397. **ARRHOPALA PSEUDOMUTA**, Staudinger.

Amblypodia pseudomuta, Staudinger, Iris, vol. ii, p. 125 (1889).

Arhopala rafflesii, de Nicéville, Butt. India, vol. iii, p. 248, n. 803, pl. Frontispiece, fig. 136, *male* (1890).

I possess only one specimen of this species from Sumatra.

398. ***ARRHOPALA AGESILAUS**, Staudinger, var. **MAJOR**, Staudinger.

Amblypodia agesilaus, Staudinger, var. *major*, Staudinger, Iris, vol. ii, p. 128 (1889).

Staudinger. Described typically and figured (*l. c.*, pl. i, fig. 17, *male*) from Palawan in the Philippine Isles, and the var. *major* from Malacca and Fort de Kock in Sumatra. It appears to be very close to *A. pseudomuta*, Staudinger. We have failed to recognise it.

399. *ARRHOPALA ANUNDA, Hewitson.

Grose Smith. Originally described from Borneo, but unknown to us.

400. ARRHOPALA TEESTA, de Nicéville.

Found at Selesseh and in the Battak mountains. It occurs in Java as well as in India, and may be the same species as *A. turbata*, Butler, from Japan.

401. ARRHOPALA APIDANUS, Cramer.

Grose Smith. Distant. Not rare.* As usual with this species, the female in Sumatra is more frequently met with in collections than the male.

402. ARRHOPALA DIARDI, Hewitson.

Grose Smith as *capeta*. Found in the Battak mountains. The "*Amblypodia*" *capeta*, Hewitson, described from Sumatra, is the female of *A. diardi*, of which Hewitson described the male only. The species has a wide range, being found in Assam, Siam, the Malay Peninsula, Sumatra, and Java.

403. ARRHOPALA AZINIS, de Nicéville.

A. azinis, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. x, p. , n. 20, pl. T, fig. 31, *male* (1896).

Described from a single male in Dr. Martin's collection taken at Bekantschan in March, 1894.

404. ARRHOPALA AZATA, de Nicéville.

A. azata, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. x, p. , n. 21, pl. T, figs. 32, *male*; 33, *female* (1896).

Occurs also in Perak in the Malay Peninsula; in Sumatra it has been taken in March, July, and November.

405. ARRHOPALA ANTHELUS, Doubleday and Hewitson.

This fine species occurs at Selesseh in Sumatra, and I possess specimens also from Java. The males from Sumatra are of a deeper shade of blue on the upperside of both wings than typical specimens from Burma, while Javan specimens are normally coloured.

406. *ARRHOPALA ANARTE, Hewitson.

Hagen. Grose Smith as *anartes* [sic]. Kirby. Distant. This species doubtless occurs in Sumatra, though we have never met with it. It is found in Burma, the Malay Peninsula, and Borneo.

407. *ARRHOPALA AUXESIA, Hewitson.

Hewitson. Kirby. Originally described from Sumatra, but we have not met with this fine species. *A. auzea*, de Nicéville, from Java, is a local race of *A. auxesia*.

408. ARRHOPALA BUXTONI, Hewitson.

Hewitson. Grose Smith. Staudinger. Distant. Originally described from Sumatra, where it is found at Selesseh.

409. ARRHOPALA FARQUHARI, Distant.

Snellen as *eumolphus*. Hagen as *eumolphus*. Grose Smith as *eumolphus*. The *A. eumolphus* of Cramer was described from the Bengal Coast, so it appears best to retain that name for the Eastern Himalayan, Assamese, and Chittagong Hill Tracts form. Its female is the *A. bupola* of Hewitson. The female of *A. farquhari* is probably the *A. maxwelli* of Distant. Snellen suggests that *A. atosia*, Hewitson, is the female of the Sumatran form; in this I cannot agree with him, *vide* Butt India, vol. iii, p. 242. I possess a long series of *A. adonias*, Hewitson, from Java from whence it was originally described. All my specimens appear to be females, and as the markings of the underside agree closely with those of *A. eumolphus*, *A. farquhari*, *A hellenore*, Doherty, and *A. horsfieldi*, Pagenstecher, I am inclined to believe that its male is a green species which does not appear to differ at all from the same sex of *A. farquhari*, though the Javan female (true *A adonias*) is of quite a different shade of colour on the upperside of both wings, being a pale silvery blue, to the deep purple coloration of the female of the true *A. farquhari* from Burma, the Malay Peninsula, Sumatra, and Borneo In Sumatra *A. farquhari* is found at Bekantschan and in the Battak mountains

410. ARRHOPALA TROGON, Distant.

Originally described from Perak in the Malay Peninsula. Very rare in both sexes, but the female seems to be more often met with than the male.

411. ARRHOPALA HORSFIELDI, Pagenstecher.

Amblypodia horsfieldi, Pagenstecher, Jahr des Nass. Ver. fur Naturk., vol. xliii, pp. 99, 106 (1890).

Arhopala basiviridis, de Nicéville, Journ. Bomb. Nat Hist. Soc , vol. vi, p 373, n 21, pl. G, fig 22, *male* (1891).

Originally described from East Java by Pagenstecher, and from the Malay Peninsula and Borneo by myself. In Sumatra it is found in the Battak mountains.

412. ARRHOPALA ANNIELLA, Hewitson.

Originally described from Singapore from a male. From superficial appearances only one would say that the *A. artegal* of Doherty from Mergui in Lower Burma is a synonym of this species. Against this is the fact that Doherty described his species from two male specimens, while the description and figure agrees with the female of *A. anniella*. In Sumatra *A. anniella* occurs in the Battak mountains.

413. ARRHOPALA SINGHAPURA, Distant.

Originally described from Singapore. Dr. Martin writes to me that he possesses this species from Sumatra, that it is a good species, and is very different from *A. anniella*, Hewitson, as it has a blunt and broad tail tipped with white, and is a smaller insect. On the underside *A. anniella* has white scales which are entirely wanting in *A. singhapura*, of which also the metallic green markings near the anal angle of the hindwing are largely different and more prominent, also shaped differently to those in *A. anniella*. The markings on the underside of *A. singhapura* are also much nearer to those of *A. diardi*, Hewitson, than to those of *A. anniella*. Till I received this note from Dr. Martin I thought that *A. singhapura* might be a synonym of *A. anniella*, Distant having figured the female of the former and the male of the latter.

414. *ARRHOPALA INORNATA, Felder.

Grose Smith. I have failed to recognise this species from any locality.

415. *ARRHOPALA PERIMUTA, Moore.

Grose Smith. This is a very distinct and easily recognised little species, and Mr. Grose Smith is not likely to have wrongly identified it. I have no record except the above of its occurrence south of Mergui in Lower Burma.

416. ARRHOPALA MORPHINA, Distant.

Very rare, found in the Battak mountains only. It is one of the most beautiful and distinct species in the genus, and was originally described from Perak in the Malay Peninsula.

417. ARRHOPALA OVOMACULATA, Hewitson.

Originally described from Sumatra. It occurs in the Battak mountains rarely in August.

418. ARRHOPALA AGESIAS, Hewitson.

Grose Smith. Originally described from Borneo. I possess one example only from Sumatra. Hewitson describes four discal spots on the underside of the forewing, but he figures five, while my specimen has six.

419. ARRHOPALA ANILA, de Nicéville.

A. anila, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. x, p. , n. 22 (1896).

I have thus named the variety *a* of Hewitson's *A. agesias*, as I see no reason why it should not be a quite distinct species. It occurs in the Malay Peninsula, at Namoe Ookor in Sumatra in August, and in Borneo.

420. ARRHOPALA METAMUTA, Hewitson.

Grose Smith. Butler. Kirby. Distant. Originally described from Sumatra, where it does not appear to be at all a common species.

421. ARRHOPALA HYPOMUTA, Hewitson.

Grose Smith. If I have correctly identified this species, it is common in Sumatra.

422. ARRHOPALA AMPHIMUTA, Felder.

Hagen. I possess one male specimen from Sumatra, which I identify a little doubtfully as this species.

423. ARRHOPALA ANTIMUTA, Felder.

Snellen. A common species. It has no tail, and is easily recognised from *A. atosia*, Hewitson, which is tailed, by this feature. Both species have a patch of differently-formed scales in the middle of the forewing on the upperside in the male.

424. ARRHOPALA DAVISONII, de Nicéville.

A very common species in Sumatra as elsewhere.

425. ARRHOPALA AVATHA, de Nicéville.

A. avatha, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. x, p. , n. 23, pl. T, fig. 34, *male* (1896).

Differs from *A. davisonii*, de Nicéville, in having the black margin to both wings on the upperside in the male twice as broad.

426. ARRHOPALA ASIA, de Nicéville.

Arhopala asia, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. vii, p. 333, n. 9, pl. H, fig. 16, *male* (1892).

Originally described from the Malay Peninsula. I possess several male specimens from Sumatra which agree with the type.

427. ARRHOPALA (*Acesina*) AMMON, Hewitson.

Originally described from Singapore. Occurs in Sumatra in the Battak mountains.

428. ARRHOPALA (*Mahathala*) AMERIA, Hewitson.

Hagen. Not uncommon; as usual, the females are more often met with than the males. This genus is the one most largely represented in Sumatra, which may perhaps be its head quarters, though the Malay Peninsula may possibly possess quite as many species. All are found in forests, but nevertheless their more or less metallic blue, purple, and green colours are not at all conspicuous and they do little to enliven the somber depths of the forest, as the restless species of *Lampides* do. *Arrhopalas* never come to small streams or damp spots on roads to suck up the moisture, or to flowers, they hardly ever fly unless disturbed, and as they always settle with folded wings, of which the undersides present only dull brown, grey, or dull purple colours, little is seen of them. They rest on leaves of shrubs of moderate height, and never fly for any length of time or to a distance, feeling themselves much more secure when at rest. There is therefore only one way to see and capture them, and that is to walk through the underwood and disturb them by beating the bushes and low trees, and thus to cause them to fly. The following species are found only in the mountains at high elevations:—*A. azinis*, de Nicéville, *A. azata*, de Nicéville, *A. teesta*, de Nicéville, *A. anthelus*, Doubleday and Hewitson, *A. ovomaculata*, Hewitson, *A. ammon*, Hewitson, and *A. morphina*, Distant. All the rest occur in the plains. *A. centaurus*, Fabricius, so common elsewhere, we have never seen in Deli, but Dr. Friedl Martin took a single specimen at the Gading Estate in Indragiri, south of Siak, in November, 1894. The rarest species are *A. amphea*, Felder, *A. anniella*, Hewitson, *A. diardi*, Hewitson, and *A. morphina*, Distant. Of the three metallic green species none is common, but *A. farquhari*, Distant, is less scarce than *A. horsfieldi*, Pagenstecher, whereas *A. trogon*, Distant, is the rarest of the three, Dr. Martin in thirteen years' collecting having obtained only two specimens.

429. CURETIS MALAYICA, Felder.

Hagen. Originally described from Malacca.

430. Curetis æsopus, Fabricius.

Originally described from the East Indies.

431. Curetis felderi, Distant.

Originally described from Province Wellesley and Sungei Ujong in the Malay Peninsula.

432. Curetis sperthis, Felder.

Hagen. Originally described from Malacca. We have followed Mr. Distant's identifications of these four species, as we have specimens from Sumatra which agree with his descriptions and figures of them. Whether they are all distinct, or how many of them are so, we are not prepared to say. The males are far more commonly met with than the females; which latter have the upperside of the wings orange bordered with black, never with the orange colour replaced by white, the more usual form of the Indian species.

433. Curetis insularis, Horsfield.

A well marked, easily identified, and probably valid species originally described from Java.

434. *Curetis bulis, Doubleday and Hewitson.

Snellen. Typically not met with by us in Sumatra.

435. *Curetis barsine, Felder.

Hagen. Originally described from Amboina. Not met with by us in Sumatra. All species of *Curetis* in Sumatra occur at low elevations with the exception of *C. malayica*, Felder, which is found in the mountains as well as in the plains. The males usually rest with closed wings on leaves near small streams, never fly for long distances, and do not go down to wet spots on roads very often, though the males are sometimes so found. The females are occasionally only caught in the forest. Their flight is so rapid that they can hardly be followed with the eye, but if they settle on the upperside of a leaf with closed wings their silvery-coloured underside at once betrays them, but if they are frightened they settle on the underside of the leaves, where they are of course invisible.

436. *Zephyrus absolon, Hewitson.

Z. absolon, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. ix, p. 291, n. 23, pl P, figs 33, *male*; 34, *female* (1895).

Recorded by me from West Java; recently captured by Dr. Hagen on Mount Kaba, 5,200 feet, in South Sumatra. He saw seven or eight specimens, but caught only one male, which Dr. Martin has seen.

437. ILERDA ILA, de Nicéville, n. sp.

Hagen as *epicles*, Godardt [sic].

HABITAT: Battak mountains, N.-E. Sumatra.

EXPANSE: ♂, 1·4 to 1·5; ♀, 1·5 to 1·6 inches.

DESCRIPTION: MALE. UPPERSIDE, *forewing* differs from typical *I. epicles*, Godart, from Java, in the iridescent deep purple colour being of greater extent, approaching much nearer the costa and the outer margin; never with a diffused yellow patch beyond the end of the discoidal cell. *Hindwing* with the purple coloration of greater extent also, the orange lunules on the margin greatly reduced in size and fewer, confined more to the anal angle. UNDERSIDE, both wings as in *I. epicles*. FEMALE. UPPERSIDE, *forewing* differs from typical *I. epicles* in having the orange area much larger, almost reaching the base of the wing. *Hindwing* differs in having a very large continuous orange area occupying the outer half of the wing, instead of a series of conjoined broad marginal lunules, with sometimes a small indistinct diffused orange patch on the disc. UNDERSIDE, *both wings* as in the male.

It is possible that "*Thecla*" *phœnicoparyphus*, Holland, described from Hainan Island, (the type being said to be a male but probably actually a female) is the name which will have to be applied to the Western Chinese and Indian form of *I. epicles*, as from the figure and description of the type of that species, the orange areas on the upperside of both wings appear to be of about the same extent; the forewing, however, has the orange area (though it is variable in extent) always less than half as large as it is in true *I. epicles*. *I. ila* differs from both in the female by the orange area on the upperside of the hindwing occupying fully half the surface instead of being confined to a marginal band.

I. ila is not very common on the Central Plateau, but occurs throughout the year, as there are specimens in Dr. Martin's collection taken in every month. I have described it from a long series of both sexes.

438. DACALANA VIDURA, Horsfield.

Grose Smith. Hagen. Distant. Occurs in the plains and on the outer hills. Is common at Selesseh in April. The collectors brought in perhaps five or six males to one female.

439. CAMENA CIPPUS, Fabricius.

I have caught this species at Selesseh in October, but it is very rare in Sumatra, as Dr. Martin possesses only one other specimen taken in July also near Selesseh.

440. CAMENA COTYS, Hewitson.

Originally described from Nepal. It is very rare in Sumatra, I possess two males only. Probably often overlooked owing to its strong superficial likeness to the more common *Deudorix vidura*, Horsfield.

441. CAMENA CRETHEUS, de Nicéville.

C. cretheus, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. ix, p. 294, n. 24, pl. P, fig. 35, *male* (1895); idem, id., l. c., vol. x, p   , n. 24, pl. T, fig. 35, *female* (1896).

Very rare, occurs in the Battak Mountains of Sumatra in March, and in Western Java. Easily recognised by the base of the costa of the forewing on the underside being yellow.

442. APHNÆUS LOHITA, Horsfield.

Grose Smith. A common species, spread over the whole of our area with the exception of the Central Plateau; the males on roads, on the margins of forest, and also on grassy places; females somewhat scarcer. They are very fond of executing the rubbing and revolving movements of the hindwings observed in many of the *Lycænidæ*.

443. *APHNÆUS SYAMA, Horsfield.

Staudinger. As this species occurs in the Malay Peninsula and in Java, it is almost certainly found also in the intervening island of Sumatra, though we have never met with it.

444. *APHNÆUS VULCANUS, Fabricius.

Hagen. Occurs commonly in Java, and is almost certainly to be found in the south-east of Sumatra, which is only separated from Java by a narrow and shallow strait.

445. APHNÆUS HIENDLMAYRII, de Nicéville.

A. hiendlmayrii, de Nicéville, Journ. A. S. B., vol. lxiii, pt. 2, p. 38, n. 33, pl. v, fig. 5, *female* (1894).

Very rare, only three female specimens have been obtained in March and August at Selesseh. The male still remains to be discovered.

446. TAJURIA BURBONA, Hewitson.

Myrina burbona, Hewitson, Ill. Diurn. Lep., *Lycænidæ*, p. Supplement 24, n. 66, pl. Supplement iiia, fig. 95, *female* (1878).
Charana datoe, Martin.

Hewitson. Hagen as *jalindra*. Staudinger as *jalindra*. Grose Smith. Originally described from Sumatra. It is a local race of *T. jalindra*, Horsfield, from Java, *T. indra*, Moore, from India, and *T. tarpina*, Hewitson, from the South Andaman Isles. The male of the Sumatran race has the black border to the forewing on the upperside narrower than in the allied species. Dr. Martin described the male, Hewitson the female. Only a few males obtained in forest near Selesseh in April, May and June ; no female.

447. *TAJURIA LONGINUS, Fabricius.

Staudinger. Found on both sides of Sumatra—in Java and in the Malay Peninsula—so it is almost certain to occur in Sumatra also.

448. TAJURIA MANTRA, Felder.

From Namoe Oekor to Bekantschan; is rarer than the species which next follows.

449. TAJURIA TRAVANA, Hewitson.

Grose Smith. Distant. Staudinger. Kirby. Butler. Originally described from Sumatra and Borneo. Common at low elevations in Sumatra.

450. TAJURIA TURA, de Nicéville.

T. tura, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. ix, p. 301, n. 27, pl. P, fig. 39, *male* (1895).

Found very rarely in August in the Battak Mountains of Sumatra, and in Western Java.

451. TAJURIA TYRO, de Nicéville.

T. tyro, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. ix, p. 302, n. 28, pl. P, fig. 40, *female* (1895).

Occurs rarely in Burma and Sumatra.

452. *TAJURIA ISÆUS, Hewitson.

Grose Smith. Kirby. Originally described from Sumatra and Sarawak in Borneo. We have seen no specimen of it from Sumatra. See remarks below, No. 458.

453. TAJURIA THRIA, de Nicéville.

T. thria, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. x, p. , n. 26, pl. T, figs. 38, *male*; 39, *female* (1896).

Found in Tenasserim, Burma, and the Battak Mountains south of Bekantschan, Sumatra, in March, May and July. It is rare, and may easily be distinguished from its allies by the male being entirely black on the upperside of the forewing.

454. TAJURIA BLANKA, de Nicéville.

T. blanka, de Nicéville, Journ. A. S. B., vol. lxiii, pt. 2, p. 39, n. 34, pl. iv, fig. 4, *female* (1894).

Two females of this very rare species have been obtained in the higher mountains; the type specimen in October, 1893.

455. TAJURIA DONATANA, de Nicéville.

Originally described from Burma. Two male specimens only have been obtained in March and July at Bekantschan at the foot of the Battak mountains in Sumatra. This species is quite distinct from the Celebesian species, *T. orsolina*, Hewitson, to which it is nearly allied.

456. OPS OGYGES, de Nicéville.

O. ogyges, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. ix, p. 298, n. 25, pl. P, figs. 36, *male*; 37, *female* (1895).

Originally described from Maulmain in Burma. Very rare, Dr. Martin obtained one male specimen in the Battak mountains in September, 1894, which I have not seen.

457. OPS MELASTIGMA, de Nicéville.

In *O. ogyges*, de Nicéville, the "male-mark" on the disc of the forewing on the upperside is indistinct, and can be seen only in certain lights. In *O. melastigma* it is exceedingly prominent, quadrate, and dingy black or fuliginous in colour. It is very rare in Sumatra, Dr. Martin possesses a single male taken in the Battak mountains in December.

458. BRITOMARTIS CLEOBOIDES, Elwes.

B cleoboides, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. ix, p 306, n. 1 (1895).

Messrs. Grose Smith and Kirby have both recorded *Tajuria isæus*, Hewitson (see No. 452) from Sumatra, but probably the specimens so identified should be the present one, which has only recently been described. The true "*Iolaus*" *isæus*, the type specimen of which was probably from Sumatra (Hewitson gives Sumatra and Sarawak as the habitat of *I. isæus* on page 44 of Ill. Diurn. Lep.), is a *Tajuria.* It was described from a male, its female being probably the *T. relata* of Distant. Hewitson in Supplement page 10 of the above-quoted work described a male *I. isæus* (which I identify as *Britomartis cleoboides,* Elwes), from Borneo, and said, incorrectly as I believe, that his first description and figure instead of applying to a male should be to a female. To sum up:—"*Iolaus*" *isæus,* and *Tajuria relata,* Distant, stand as *Tajuria isæus,* Hewitson, male and female, from the Malay Peninsula and Sumatra; while Hewitson's second figure of "*Iolaus*" *isæus* in the supplement of his book, which is also taken from a male, stands as *Britomartis cleoboides,* Elwes, from Burma, Sumatra, Java and Borneo. It is rare in Sumatra, found in June and July at Selesseh.

459. BRITOMARTIS BUTO, de Nicéville.

B. buto, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. ix, p. 308, n. 29, pl. P, fig. 41, *female* (1895).

Occurs in Burma and Sumatra; described from a single example from each locality.

460. SUASA SUESSA, de Nicéville.

S. suessa, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. vii, p. 337, n. 14, pl. H, figs. 8, *male*; 9, *female* (1892).

Originally described from the Malay Peninsula. Found very rarely in the Battak mountains from Namoe Oekor to Bekantschan in December and January, and again in July.

461. *THAMALA MARCIANA, Hewitson.

Butler. Kirby. Grose Smith. Originally described from Sumatra, and Sarawak in Borneo, but not obtained by us. It almost certainly occurs in Sumatra, as it is found in the countries on both sides of it.

462. HYPOLYCÆNA ERYLUS, Godart.

Hagen as *erylus,* Godardt [sic]. Common at low elevations and throughout the year. The female is very rare.

463. HYPOLYCÆNA THECLOIDES, Felder.

Staudinger. Very rare, only two specimens obtained, both females, one at Selesseh, the other in Indragiri in February.

464. HYPOLYCÆNA SIPYLUS, Felder.

I possess a single worn female example from Sumatra which appears to represent this species. It occurs also in Celebes and Amboina, the allied *H. tharrytas*, Felder, being found in the Philippines.

465. Chliaria tora, Kheil.

C. tora, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. ix, p. 311, n. 31, pl. P, fig. 43, *female* (1895).

Originally described from Nias; occurs also in the Malay Peninsula in Perak, in Sumatra at Selesseh and Bekantschan, and in Borneo. It flies in every month in the year in Sumatra; the males are found with different species of *Nacaduba*, &c., on wet spots on roads.

466. Chliaria merguia, Doherty.

Originally described from Lower Burma. Found in Sumatra from Bekantschan to the higher Battak mountains in the last three months in the year, but is a rare species.

467. Chliaria amabilis, Martin.

C. amabilis, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. ix, p. 309, n. 30, pl. P, fig. 42, *male* (March, 1895); *Zeltus amabilis*, Martin, Einige neue Tagschmetterlinge von Nordost-Sumatra, pt. 2, p. 11, n. 9 (October, 1895).

Found in Java. In Sumatra it flies from Selesseh to Bekantschan in June, July and August. Rare, Dr. Martin has obtained five or six specimens only.

468. Zeltus etolus, Fabricius.

Hagen. Grose Smith. Found all over our area and is everywhere common, the males on wet roads, the females much scarcer and flying in the jungle. Dr. Martin has made the same observation that I did fourteen years ago when I first saw this butterfly alive (Journ. A. S. B., vol. l, pt. 2, p. 59, n. 105 (1881) that "The male when flying over small puddles of water reminds one very much of a common blue-bodied dragonfly."

469. Neocheritra amrita, Felder.

Grose Smith. Snellen. Hagen. Occurs in the mountains south of Bekantschan in July. We have never seen a male, and the female is rare.

470. Neocheritra namoa, de Nicéville.

N. namoa, de Nicéville, Journ. A. S. B., vol. lxiii, pt. 2, p. 41, n. 36, pl. v, fig. 9, *male* (1894).

Described from a unique male captured in the Battak mountains in May, 1893. Since then a second specimen was obtained in December, 1894, at the same locality by a clever Battak collector named Sinobar.

471. NEOCHERITRA NISIBIS, de Nicéville.

N. nisibis, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. ix, p. 316, n. 33, pl. P, fig. 45, *female* (1895).

Described from two females, one each from the Malay Peninsula and Sumatra.

472. THRIX GAMA, Distant.

This is a very remarkable genus, the male having a somewhat similar tuft of hairs on the upperside of the forewing to that found in the genera *Dacalana* and *Airhenothrix.* It occurs rarely in Sumatra from Selesseh to Soengei Batoe in May, June and July. The males vary in size from 1·45 to 1·75 inches.

473. MANTO MARTINA, Hewitson.

M. martina, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. ix, p. 314, n. 32, pl. P, fig. 44, *female* (1895).

Originally described from Borneo, but is found also in Burma, the Malay Peninsula and Sumatra. Occurs at low elevations as high only as Namoe Oekor from February to July and again in October.

474. JACOONA ANASUJA, Felder.

Hitherto known only from the Malay Peninsula. The female has still to be discovered. Very rare, only two specimens obtained in thirteen years, both at Selesseh in May.

475. NEOMYRINA HIEMALIS, Godman and Salvin.

Hagen. With the exception of *Arrhopala agnis*, Felder, this is the largest of our *Lycænidæ.* Very rare, as it flies very high and quickly in the forest. Dr. Martin once saw a specimen flying across a small open grassy patch from one piece of forest to another. Its flight was so rapid that its long tails were nearly invisible, and at first sight it gave the impression of being a specimen of the smaller white *Catopsilia* (*C. pyranthe*, Linnæus). It is found over the whole of our area, with the exception perhaps of the Central Plateau. Dr. Martin has specimens from the Gayoe-lands, Selesseh, Deli and Asahan. It is probably less rare in the western part of our area, as at Padang Tjermin in Langkat an amateur collector obtained some ten specimens in one year.

476. TICHERRA ACTE, Moore.

Common from Namoe Oekor to the Central Plateau throughout the year.

477. CHERITRA FREJA, Fabricius.

Hagen as *freya* [sic]. Grose Smith. Still commoner than the foregoing species, and occurs in forest only over the whole of our area.

478. RITRA AUREA, Druce.

R. aurea, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. x, p. , n. 30, pl. T fig. 45, *female* (1896).

Found in large forest near Selesseh, Namoe Oekor, and from Bandar Kwala in Serdang in March, April, May and June. The female is much rarer, and lacks on the upperside the splendid orange gloss on both wings. The silky "male-mark" of this species closely resembles that organ in *Biduanda cinesioides*, de Nicéville, No. 486 below.

479. HORAGA HALBA, Distant.

Originally described from Penang. It occurs from Selesseh to Bekantschan, and in the months of March, July and October. Very rare, as Dr. Martin has not obtained more than four specimens in thirteen years.

480. CATAPŒCILMA ELEGANS, Druce.

Grose Smith. Hagen. Common throughout the year over the whole of our area with the exception of the higher elevations, and found not only in forests, but also near roads, and settled on small bushes. Dr. Martin has never seen this butterfly on the wing in the morning, it appears very late in the day, at one or two o'clock P. M. The males are very fond of fighting, but return always with great exactitude to the leaf from which they started to do battle with the foe, which is usually another male of the same species.

481. SEMANGA SUPERBA, Druce.

HABITAT: Borneo (*Druce*); Malacca, Malay Peninsula (*Distant*); N.-E. Sumatra.

EXPANSE: ♂, 1·1 inches.

DESCRIPTION: MALE. UPPERSIDE, *both wings* differ from those of the female only in having the purple area considerably larger, more shining and richer in shade. *Forewing* with the apex more acute and the outer margin more convex than in the female. *Hindwing* lacks the discal orange band of the female; the wing is also narrower and the outer margin straighter. UNDERSIDE, *both wings* as in the female.

Grose Smith. In Sumatra it occurs rarely in the Battak mountains and at Selesseh in July, August and October.

482. BIDUANDA THESMIA, Hewitson.

Grose Smith. Staudinger. Distant. Very common in the forests from the plains to the elevation of Bekantschan, and occurs all the year round. Both sexes rest on the buds of some moderately high shrub, with the head mostly downwards. It occurs exactly in the same localities and is quite as common as *Marmessus moorei*, Distant, which it greatly resembles. If one species mimics the other it would be difficult to say which is the model and which the one that copies it.

483. *BIDUANDA ESTELLA, Hewitson.

Hewitson. Grose Smith. Kirby. Both sexes originally described from Sumatra. As Hewitson does not mention any secondary sexual characters in the male, and the inner margin of the forewing as described and figured is straight instead of bowed outwardly, it is more than probable that it does not come into the genus *Biduanda*, as that genus possesses male secondary sexual characters, but in the absence of specimens I do not know where else to place it.

484. BIDUANDA SCÆVA, Hewitson.

Originally described from Singapore. In Sumatra it is found only in the mountains at higher elevations, where it flies throughout the year, as Dr. Martin possesses specimens from every month. It must be very common under favourable conditions, as one collector once brought in a consignment of sixty specimens. The female is very rare.

485. BIDUANDA NICEVILLEI, Doherty.

First discovered in Burma. Very rare in the Battak mountains, Dr. Martin possesses three females only taken in January, March and December. Dr. Martin thus describes his specimens, the female being hitherto unknown. "FEMALE. EXPANSE: 1·35 inches. UPPERSIDE, *forewing* brown, in the middle somewhat brighter, more reddish. *Cilia* dark brown. *Hindwing* with two subanal black spots, somewhat confluent, bordered inwardly by a large pure white area which occupies the posterior half of the wing; a fine anteciliary black line. *Cilia* white. *Tails* three, white. UNDERSIDE, *both wings* as in the *male*."

486. BIDUANDA CINESIOIDES, de Nicéville.

Originally described from the Malay Peninsula. Is not as rare as the foregoing species, but is much rarer than the two other *Biduandas.* Found in the Battak mountains in January, April, July and December. The male has a very conspicuous sexual mark on the upperside of the forewing.

487. MARMESSUS MOOREI, Distant.

Hagen. Staudinger. Distant. Snellen. One of the commonest lycænids of the forest of the plains and outer hills, and flies throughout the year. Superficially very similar to *Biduanda thesmia*, Hewitson, not only in coloration and form, but also in habits. Mr. Distant has figured on pl. xliv, fig. 11 of Rhop. Malay. a very small female of this species as a variety. Such dwarf forms in both sexes are not at all rare in Sumatra.

488. MARMESSUS BOISDUVALII, Moore.

Dr. Martin possesses a single pair which appertains to this species, as they have a large discal orange patch on the upperside of the forewing. They were taken in the Battak mountains in February.

489. *MARMESSUS RAVINDRA, Horsfield.

Hagen. Grose Smith. As this butterfly is found in Nias and Java, it not improbably occurs in south-eastern Sumatra also.

490. EOOXYLIDES THARIS, Hübner.

Grose Smith. Moderately common in the low forests at Selesseh and Namoe Oekor, and occurs throughout the year. It is rarer than *B. thesmia*, Hewitson, and *M. moorei*, Distant.

491. LOXURA ATYMNUS, Cramer.

Hagen.

492. LOXURA CASSIOPEIA, Distant.

Hagen. Originally described from Perak in the Malay Peninsula. Both the species of *Loxura* occur throughout the year at low elevations not much higher than Namoe Oekor in forest or its margins. They have a short and jerky flight, and are weak on the wing, never flying for long distances.

493. YASODA PITA, Horsfield.

Grose Smith. Hagen. Originally described from Java.

494. Yasoda pitane, de Nicéville.

Y. pitane, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. viii, p. 50, n. 10, pl. L, fig. 5, *male* (1893).

The female of this species still awaits discovery. Both species of *Yasoda* occur only at high elevations, *Y. pita*, Horsfield, in March, October and December at Soengei Batoe, *Y. pitane* only on the Central Plateau in March and August. Both are really and actually rare butterflies.

495. Araotes lapithis, Moore.

Found from Selesseh to Bekantschan, and is moderately rare in forests from March to August. On the wing its habits are like those of *M. moorei*, Distant, and, as the white band on the underside of the forewing is not seen when resting with closed wings, is often taken for that common species, and thus escapes being captured.

496. Sithon nedymond, Cramer.

Grose Smith as *nedymond* and *chitra*. Hagen as *nedymond* and *chitra*. Staudinger. Kirby. Distant. *S. nedymond* is the male and *S. chitra*, Horsfield, the female of one and the same species. Occurs over the whole of our area, as we possess specimens from Stabat, Selesseh, Namoe Oekor, and from the Battak mountains, taken from March to August, and October to December. In primeval forest on low bushes, mostly resting on the underside of leaves. *S. nedymond* and *S. chitra* are always taken at the same time and in the same localities, though we have never succeeded in getting them paired. The species is far less rare than it was formerly believed to be.

497. Deudorix epijarbas, Moore.

Moderately rare in forests from Selesseh to Bekantschan, the female much rarer than the male. Males differ greatly in size, from 1·2 to 1·7 inches. Flies from March to August and again in December.

498. Zinaspa distorta, de Nicéville.

A rare butterfly here as elsewhere, Dr. Martin has only four specimens, three males and one female, the latter captured in January, the former from June to August. Occurs from Namoe Oekor to Soengei Batoe.

499. Rapala deliochus, Hewitson.

A very rare species. I caught a single male at Selesseh in October. Dr. Martin possesses a few of both sexes from Selesseh to Bekantschan taken in May, June, July and October. The males vary greatly in size, the smallest measures ·95 of an inch, the largest 1·35 inches. The markings and coloration of the underside remind one of those of *Lampides*, which is considered to be a protected genus, and may perhaps to some extent account for the scarceness of specimens of *R. deliochus* in collections, as they are passed over for the common species of *Lampides* which they may mimick.

500. Rapala rhœcus, de Nicéville.

R rhœcus, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. ix, p. 319, n. 35, pl. P, fig. 47, *male* (1895); idem, id., l.c., vol. x, p. , n. 27, pl. T, fig. 40, *female* (1896).

Taken at Bekantschan and in the Battak mountains, where this fine species is fairly common in May and July, rarer in March, April and October. The female on the upperside is somewhat marked with red on both wings, on the inner margin of the forewing, and near the anal angle of the hindwing, an unusual feature in this genus.

501. Rapala schistacea, Moore.

A few specimens only from Selesseh taken in May and June.

502. Rapala scintilla, de Nicéville.

Hitherto known from Sikhim only. Its occurrence so far south is very interesting. It is quite a distinct species, which can always be discriminated in both sexes by the peculiar coloration of the underside alone, though as regards the male the restriction of the blue gloss to the upperside of the hindwing best distinguishes that sex. In Sumatra it is commoner than *R. schistacea*, Moore, and is found from Selesseh to Bekantschan from March to June.

503. Rapala orseis, Hewitson.

Hewitson. Grose Smith. Kirby. Distant. Originally described from Sumatra, certainly the commonest species of the genus, and found from Bindjei to Soengei Batoo throughout the year.

504. *Rapala chozeba, Hewitson.

Hewitson. Grose Smith as var. *chozeba*. Hagen as *Deudoryx* [sic] *chozeba*. Kirby. Originally described from Sumatra. We have failed to recognise it. It is very near to *R. orseis*, Hewitson.

505. Rapala nissa, Kollar.

Only two females taken in the Battak mountains in October, 1893.

506. **Rapala abnormis**, Elwes.

R. abnormis, Elwes, Proc. Zool. Soc. Lond., 1892, p. 642, pl. xliv, fig. 2, *male.*

Originally described from the Karen Hills, Burma. A very rare species with the underside quite uniquely marked. Three specimens from the Battak mountains in July.

507. **Rapala pheritima**, Hewitson.

Originally described from Borneo (Sarawak). It is recorded by Moore in Proc. Zool. Soc. Lond., 1883, p. 528, from Tounghoo in Burma, Singapore, and Sumatra, but not from Borneo, from whence the type came. Dr. Martin obtained a single pair in Indragiri in Eastern Sumatra in February.

508. **Rapala rhodopis**, de Nicéville.

R. rhodopis, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. x, p. , n. 28, pl. T, figs. 41, *male*, 42, *female* (1896).

Occurs rarely in the Battak mountains in March, May, July, August, and September, and again in December. Also one male taken at Selesseh.

509. **Rapala rhoda**, de Nicéville.

R. rhoda, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. x, p. , n. 29, pl. T, figs. 43, *male*; 44, *female* (1896).

Described from a single pair obtained in the Battak mountains in February.

510. **Rapala suffusa**, Moore.

Originally described from Burma, found also in Assam. Rare in Sumatra, Dr. Martin possesses only two females, and I three males and two females taken at low elevations.

511. ***Rapala melampus**, Cramer.

Snellen as *Deudoryx* [sic] *melampus.* Hagen as *Deudoryx* [sic] *melampus.* As Heer P. C. T. Snellen has recorded this species in two of his papers on the butterflies of Sumatra, as well as Dr. Hagen, there can be no reasonable doubt that it occurs in the island, though we have not met with it.

512. **Rapala jarbas**, Fabricius.

Next to *R. orseis*, Hewitson, this is the commonest species of the genus in Sumatra at low elevations, not higher than Namoe Oekor.

Occurs not only in forest, but also in gardens and near houses. It often flies very late in the afternoon, Dr. Martin has taken it between 5 and 6 P. M.

513. RAPALA XENOPHON, Fabricius.

Distant. Much rarer than *R. jarbas*, Fabricius, and occurs at a higher elevation from Selesseh to Bekantschan. We have specimens taken in March, July, and December only.

514. RAPALA DOMITIA, Hewitson.

Grose Smith. Dr. Martin obtained a single female in November at Kepras. It is a most aberrantly-marked and coloured species.

515. BINDAHARA PHOÇIDES, Fabricius.

Very rare in Sumatra, Dr. Martin in thirteen years having obtained only three males and one female in February, May, and July. Only from higher elevations in the Battak mountains. Distant's figure of the species (Rhop. Malay., pl. xx, fig. 25, *female*) is an exceptionally bad one. The males vary greatly in size, the smallest measuring 1·35, the largest 1·75 inches; Dr. Martin's only female taken in February measures 1·6 inches.

516. BINDAHARA SUGRIVA, Horsfield.

One male only, taken in the Battak mountains in July. It is on the underside of both wings very similar to the same sex of *B. phocides*, Fabricius, but it has on the upperside of the hindwing a blue band extending along the margin from the apex to the third median nervule, and increasing in breadth posteriorly. The occurrence of this species recorded from South India, Ceylon and Java, together with *B. phocides*, Fabricius, (which has no blue band in the male), recorded from Sikhim, Bhutan, Assam, Burma, the Andaman Isles, the Malay Peninsula, and Nias, in North-Eastern Sumatra is a very interesting fact. Mr. W. H. Miskin records *B. sugriva* from Cape York in North Australia, the Solomon Islands, and the Aru Islands, but in my opinion these specimens are probably not typical, but represent distinct local races.

517. *SINTHUSA NASAKA, Horsfield.

Grose Smith. Originally described from Java, so that it is quite possible it occurs also in Sumatra though we have not met with it, especially as it is found again in Northern India.

518. SINTHUSA AMBA, Kirby.

Originally described from Malacca, occurs also in Burma.

519. SINTHUSA MALIKA, Horsfield.

S. malika, de Nicéville, Journ. A. S. B., vol. lxiii, pt. 2, p. 43, n. 37, pl. v, figs. 18, *male*; 6, *female* (1894).

Snellen. Grose Smith. Kirby. This species and *S. amba*, Kirby, occur in the mountains rarely at higher elevations south of Bekantschan. Of *S. amba* Dr. Martin possesses specimens taken in April and May, and again in July and August, and *S. malika* in March and April, June and July, and October and December, so of the former there may be two, and of the latter three generations in the year.

Family PAPILIONIDÆ.

Subfamily PIERINÆ.

520. LEPTOSIA XIPHIA, Fabricius.

Snellen as *nina*. Wallace as *nina*. Hagen as *nina*. Distant Very weak and slow on the wing, and behaves exactly as the European *Leptidia* (= *Leucophasia*) *sinapis*, Linnæus, does, flying near the ground and seldom settling. It has been well named "The Wandering Snowflake." Occurs in open places in forests or on their margins, from Solesseh to Bekantschan, rather rare than common, occurs all the year round except possibly in June, from which month Dr. Martin does not possess any specimens with dates.

521. *DELIAS NINUS, Wallace.

Hagen as *ninus* and *dione*. Staudinger as *dione*. Originally described from Mount Ophir, Malacca, Malay Peninsula. Dr. Hagen records it from the Karo mountains. We have not met with it. According to von Mitis (Iris, vol. vi, p. 100, n. 5 (1893), *D. aglaia*, Linnæus, is an older name for *D. dione*, Drury, that species however being confined to the Eastern Himalayas, Assam, Burma, and China. Von Mitis restricts *D. ninus* to the Malay Peninsula.

522. *DELIAS PARTHENOPE, Wallace.

Hagen. Mitis. Originally described from Singapore and Borneo. Not obtained by us. Dr. Hagen says it is found only on the alluvial plain near the sea, is the only butterfly of the mangrove forest, and is even sometimes observed at sea.

523. *DELIAS EGIALEA, Cramer.

Wallace. Snellen. Staudinger. Kirby. A Javan species, which may perhaps occur at the south-eastern end of Sumatra.

524. DELIAS TOBAHANA, Rogenhofer.

D. tobahana, Rogenhofer, Verh zool.-bot. Gesellsch. Wien, vol. xlii, p. 571, n. 1 (1893); id., Mitis, Iris, vol. vi, p. 102, n. 13, pl ii, fig. 1, *female* (end of January, 1893).

D. dercето, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. vii, p. 557, n. 12 (23rd April, 1893); idem, id., l. c., vol. viii, p. 52, n 12, pl. L, fig 4, *male* (1893).

Rogenhofer. Hagen. Originally described by Herr Rogenhofer and I from Sumatra. Found only on the Central Plateau in the Toba and Karo districts, where it is by no means common, and strange to say, the males rarer than the females. Dr. Martin has specimens taken only in March, May, June, July, and September. It is of very delicate structure, and seldom seen perfect.

525. DELIAS BELLADONNA, Fabricius.

Pieris chrysorrhœa, Vollenhoven, Mon. Piérides, p. 6, n. 3, pl. ii, fig. 4, *male* (1865).

Kirby as *chrysorrhœa* [sic]. I do not propose in this place to discuss the innumerable forms of this species which have been described and named, of which von Mitis enumerates seven "varieties" besides the type, and has omitted two others, *D. hearseyi* and *D. boyleæ*, both of Butler. To these names I have to add the "*Pieris*" *chrysorrhœa* of Vollenhoven, described from the mountains in the interior of Sumatra. This species does not appear to have ever been properly understood, even von Mitis in his recent Monograph of the genus does not put it in the same group as *D. belladonna*. The figure differs from our specimens of *D. belladonna* from the Battak mountains in having the white areas on the upperside of both wings, but especially of the hindwing, larger and more or less coalescing. The figure does not show the characteristic yellow spot at the base of the hindwing on the upperside owing to the way the specimen drawn was set, the costa of the hindwing being broadly covered over by the forewing. The non-perception of this spot is probably the cause that the species appears never to have been recognised until now, combined with the fact that *D. belladonna* in none of its forms was ever suspected to occur in the region of the equator. The vast stretch of country between Assam, the most southernly point hitherto known for *D. belladonna*, and Sumatra has however been partially bridged over by the discovery of the butterfly by Capt. E. Y. Watson in the Chin and Shan Hills of

Upper Burma, and by Colonel C. T. Bingham at the top of Mooleit mountain and at a lower elevation in the Daunat Range, both in Middle Tenasserim, Burma. The Burmese and Sumatran specimens in our collection quite agree, and would probably be called var. *amarantha*, Mitis, by the describer, who gives Darjiling as the habitat of that form. In Sumatra it is very rare, occurring only at Soengei Batoe and on the Central Plateau, Dr. Martin in thirteen years collecting only obtained ten specimens, of which seven were captured in June and July, and one each in January, March, and October. All these specimens shew but little variation in colouring and markings. The single female Dr. Martin possesses has the ground-colour slightly lighter than in the male, more brown than black, the spots on both wings are larger and more yellow, in the male they are whitish, and the anal area is pale yellow instead of dark yellow as in the male. Dr. Martin gives the expanse of his male specimens as 1·8 to 2·4, of the female 2·3 inches, hence they average somewhat less than specimens from the Eastern Himalayas. Since the above was in type I have seen Heer P. C. T. Snellen's note on this species in Tijd. voor Ent., vol. xxxviii, p. 26 (1895), in which he calls ***P.*** *chrysorrhœa* a small local variety of *P. belladonna.*

526. DELIAS GLAUCE, Butler.

Snellen as *belisama.* Hagen as *belisama*, and *belisama*, var. *glauce.* Wallace as *belisama.* Staudinger as *belisama.* Kirby as *belisama.* Grose Smith. The true *D. belisama* of Cramer, is, I believe, confined to Java, while *D. glauce* takes its place in Borneo and Sumatra. It is common on the Central Plateau round the Battak kampongs, where it frequents the red flowers of the "Datap" trees (*Erythrina indica*, Lam.), according to Dr. Hagen. Dr. Martin has obtained a few specimens also from Soengei Batoe and even from Bekantschan, where they may perhaps have been carried by one of the frequent heavy storms that occur in the mountains. The female is very melanic in its colouring, as the white areas on the upperside of both wings in the male are very greatly reduced in the female. It occurs most commonly from May to July, but it flies in every month in the year.

527. DELIAS HYPARETE, Linnæus.

Hagen. Wallace. Common over the whole of our area, even on the Central Plateau, mostly in orchards near houses, as the species of *Viscum* on which the larva feeds grows very frequently upon fruit-trees, especially on *Anonaceæ.* If flies throughout the year, but is most abundant in May. The larva is yellow and hairy; the pupa is dark yellow with deep shining black (as if varnished) spots. The males are very fond of flowers, on which they settle with closed wings like an *Euplœa.* It is almost certain that all the species of *Delias* feed in the larval state on *Viscum* and *Loranthus* which are found everywhere, and as there are species of *Loranthaceæ* occurring also on Rhizophores (Mangrove trees) on the sea beach, the strange fact which has been observed by Dr. Hagen that *D. parthenope*, Wallace, is the only butterfly found in the Mangrove forests, is explained.

528. DELIAS SINGHAPURA, Wallace.

Hagen. One female only obtained near Selesseh in June, 1894.

529. DELIAS DANALA, de Nicéville.

D. danala, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. viii, p. 51, n. 11, pl. L, fig. 9, *male* (1893).

D. karo, Hagen, Iris, vol. vii, p. 33, n. 61, pl. i, fig. 4, *male* (1894).

Hagen as *karo.*

530. DELIAS HAGENI, Rogenhofer.

D. hageni, Rogenhofer, Verh. zool.-bot. Gesellsch. Wien, vol. xlii, p. 572, n. 2, (end of January, 1893); id., Mitis, Iris, vol. vi, p. 113, n. 75, pl. iii, fig. 5, *male* (1893).

D. datames, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. vii, p. 557, n. 10 (23rd April, 1893); idem, id , l. c., vol. viii, p. 53, n. 13, pl. L, fig. 8, *male* (1893).

D. simanabum, Hagen, Iris, vol. vii, p. 34, n. 63, pl. i, fig. 3, *female* (1894).

Hagen as *hageni* and *simanabum.* Both *D. hageni* and *D. danala*, de Nicéville, occur only at the elevation of Soengei Batoe and on the Central Plateau; they are most numerous from June to August, during the other months of the year but few specimens have been obtained.

531. PRIONERIS CLEMANTHE, Doubleday.

Hagen. Rare in our area, a few specimens only from near Selesseh including one of the excessively rare females. Like *Hebomoia borneënsis*, Wallace, it is more common on our western boundary, as the Gayoe collectors have brought in males in large numbers. Flies from January to June, but is most abundant in February.

532. PRIONERIS HYPSIPYLE, Weymer.

P. hypsipyle, Weymer, Stet. Ent. Zeit., vol. xlviii, p. 12, n. 10, pl. i, fig. 1, *male* (1887).

Hagen as *hypsypule* [sic]. My female differs from the male only in the forewing being blunter, less produced at the apex. Dr. Martin and I have obtained a single example each of this sex. The male is somewhat variable, in some specimens more than half the discoidal cell on the underside of the hindwing is black, with a very small basal vermilion patch, while in others there is no black coloration in the cell at all, and the vermilion patch is very large. Intermediate examples occur between these two extremes. Both sexes are quite distinct from the Javan *P. autothisbe*, Hübner. The males are very common, quite as common as are *Hiposcritia pandione*, Hübner, and *H. cardena*, Hewitson, all through the year at Soengei Batoe and on the Central Plateau, where in every month hundreds of males are brought in by the collectors. Both sexes mimic *Delias glauce*, Butler. Dr. Martin thus describes his female example, which was taken in March, 1893:—"Mimics the same sex of *D. glauce*, Butler. The outline of the forewing is quite rounded like that of a *Delias*, and the costa of course is not serrated. The base of the costa of the forewing on the upperside has two minute sulphur-yellow streaks which in the male are black. The upperside of the forewing has a more bluish and the hindwing a more reddish and transparent colour than in the male. The white spots at the apex and on the outer margin of the forewing both above and below are very much reduced, the inner series entirely wanting except the anteriormost spot, the outer series consisting of five spots, in the male there are six, which are indistinct, obsolete, and whitish. The underside of both wings is duller than in the male."

533. CATOPSILIA CROCALE, Cramer.

Hagen as *crocale* (1775), *catilla* (1779), and *pomona* (1775). Wallace as *alcmeone*, Cramer (1777). Grose Smith. Butler. Distant. This is the largest and commonest species of *Catopsilia* occurring in Sumatra. Most authors retain *C. catilla*, Cramer, as a species distinct from *C. crocale.* I have bred both species from found larvæ (not from the egg laid by a known female in confinement, which is practically the only conclusive test of the distinctness of species), and have failed to discover any differences in the larva and pupa of the two supposed distinct species. My opinion is that *C. crocale* is extremely variable, and that the variations noted are not due to seasonal causes. Dr. Martin does not agree with me that we have here to deal with one protean species, but maintains that there are really two quite distinct species. At his request I give below his reasons for this conclusion. I may add that I have carefully examined a very large mass of material in the collection of the Indian Museum, Calcutta, and my own, and find that the distinctive characters on which Dr. Martin relies to separate them are all quite inconstant and entirely break down, the black antennæ of *C. crocale* being sometimes found with the ocellated underside of *C. catilla*, and *vice versa*. The restriction of the yellow coloration of the upperside of both wings of the male to the basal area, or its equal diffusion over the whole surface, correlated with the presence or absence of the ocelli on the underside, is also quite an unstable feature by which to distinguish the two species. Dr. Martin writes:—

"I am quite unable to follow Mr. de Nicéville in his amalgamation of *C. crocale* and *C. catilla*, and am forced to keep them separate for the following reasons:—

"*C. crocale*, the far commoner species, occurs in Sumatra on roads, near houses and gardens, and is never found in the forest. It sometimes appears in large numbers, in which case the larvæ are very destructive, as in January, 1893, near the Poengei Estate, five kilometers north of Bindjei, they destroyed in a short time a fine plantation of young iron-wood trees, *Cassia florida*, Vahl., valued at least at $ 3,000, by eating up all the leaves and suffocating the plants. All the grass and every low shrub near this murdered plantation was covered with the pupæ, and after the butterflies had emerged, the whole place looked as if there was a heavy snow-storm in progress, the air being full of large flakes of snow. I took there many hundreds of specimens of both sexes, but amongst them was not a single *C. catilla*. This seems to me to be an abundantly conclusive fact. The antennæ of *C. crocale* are black in both sexes, and the males have the underside of both wings simply yellow and white of a washed-out shade. The tuft of hair on the inner margin of the forewing is whitish. There are two forms of the female of *C. crocale*:—I, the form figured by Distant in Rhopalocera Malayana, pl. xxv, fig. 12, without any yellow colour near the base of both wings on the upperside; Sumatran specimens are even somewhat darker than Distant's figure, and show on the upperside of the hindwing four or five submarginal black lunules, this form being the rarer one. II, the commoner form is brighter, not so black as the first form, the basal half of the upperside of both wings is nearly as yellow as in the male, the black markings on the costa, apex, at the end of the discoidal cell, and the outer margin of the forewing on the upperside are sharper defined. *C. crocale* is enormously common, and occurs throughout the year; the males are fond of flowers, and especially of the *Hibiscus rosa-sinensis*, Linnæus, to the deep crimson cups of which they present a beautiful contrast when settled. The larva feeds on the leaves of the above-mentioned *Cassia florida*, and sometimes in company with *Catopsilia pyranthe*, Linnæus, on *Cassia alata*, Linnæus, and is of a yellowish-green or yellowish-brown colour, with a lateral blackish-brown streak. The pupa, suspended by a white median girth, is green with a yellow lateral streak and a very pointed head."

"*C. catilla* is found only in the forest, the males on forest roads on wet spots together with *Lycænidæ* and *Papilioninæ*, but they form the larger number of such congregations, and often occur in such large crowds that dog-cart horses get frightened on approaching one of these white spots on the road, which all at once flutters up into the air with an audible sound. If driven away from these favourite spots, they fly rapidly in Indian file up and down the forest roads, and fall in again on the same spot when the danger is passed. *C. catilla* appears never to be a destructive insect as is *C. crocale* at times. The antennæ in both sexes are distinctly red. The male has on the underside of both wings at the termination of the discoidal cell some red spots, one in the forewing, two in the hindwing, the latter with silvery centres. The sexual tuft of hair is of a darker shade of yellow than in *C. crocale*, and the whole colouring of the underside is of a dull, silky, or leather-like gloss. There is also on the underside of the forewing a somewhat obscure reddish band, commencing near the apex of the wing, and extending towards the middle of the inner margin, ending on the second median nervule. *C. catilla* also has two forms of female:—I, the form figured by Distant on pl. xxv, fig. 15, which exhibits numerous varieties as regards the extent of the reddish-brown colour on the underside of both wings, there being all gradations from specimens with very little red to quite dark ones. II, the second form is on the upperside of both wings pale sulphur-yellow, and not dark yellow as in the first form, and the costal and marginal black spots on the upperside of both wings are not so distinct; on the underside there is never any reddish-brown colouring. This form is the rarer, I have always obtained one of it to five of the other. I am entirely ignorant of the larva, pupa, and food-plant of *C. catilla*; but as the larval stages of the two other *Catopsilias* occurring in Sumatra, *C. pyranthe*, Linnæus, and *C. scylla*, Linnæus, which I know very well, differ only slightly from those of *C. crocale*, it may be anticipated that the early stages of *C. catilla* also possess the same characteristics. *C. crocale*, *C. pyranthe*, and *C. scylla* I have bred on different species of *Cassia*, so also *C. catilla* will probably be found some day in the larval stage feeding on a *Cassia* growing in the forest."

534. CATOPSILIA PYRANTHE, Linnæus.

Grose Smith. Snellen. Wallace. Hagen as *pyranthe*, *philippina* and *chryseis*. Distant as *chryseis*. The form of this species found in Sumatra has in both sexes on the upperside of the forewing a broad outer black margin, this form being the *C. chryseis* of Drury. It is quite typical throughout the Malay Peninsula, but when it reaches the latitude of Burma it gradually merges into typical *C. pyranthe*, which latter is found all over India and Ceylon. It is not seasonally dimorphic in Sumatra as it is in India. In our area it is found only at low elevations, not higher than Namoe Ookor, where it is local owing to the presence or absence of *Cassia alata*, Linnæus, the food-plant of its larva. As this tree is very partial to swampy ground, and even grows in swamps with brackish water, *C. pyranthe* occurs very near the sea, and flies all the year round. It has only one form of female, but it is variable, some specimens being much more melanic than others. The larva is quite green, without the lateral brown streak of *C. crocale*, Cramer. The pupa has a blunt rounded head, not a pointed one as in *C. crocale*.

535. CATOPSILIA SCYLLA, Linnæus.

Snellen. Grose Smith. Hagen. Kirby. Distant. Wallace. Dr. B. Hagen informed Dr. Martin that this species was not at all rare near Medan, the capital of the Deli district, from 1879 to 1882. Dr. Martin had never seen it in the plains, and had received a few specimens only from the Central Plateau from Battak collectors. In Penang and Singapore on the mainland of Asia it is always very common in gardens. So Dr. Martin would hardly believe Dr. Hagen that *C. scylla* belonged to the fauna of the plains of Sumatra, especially as Dr. Martin never saw or obtained any specimens from 1882 to 1894. Suddenly in August and September of the latter year, after nearly twelve years interval, *C. scylla* appeared everywhere in Deli and Langkat in suitable places such as gardens and fallow-land near houses where *Cassia sophera*, Linnæus, the food-plant of the larva, grows. Since then *C. scylla* belongs to our fauna, although it is the rarest of all our *Catopsilias*, and we would call attention to the interesting fact that a butterfly has disappeared for twelve years from a spot in every way apparently suitable for its existence, and has again reinstated itself by immigration from the south-west (the Battak and Gayoe mountains) or from the east (the Malay Peninsula over the shallow Straits of Malacca). The larva is dark velvety-green, with a yellowish-white lateral streak, and some very minute black spots on each segment anterior to the streak, the whole surface delicately ringed or indented like a leech. The pupa has a pointed head like that of *C. crocale*, Cramer, but is shorter and more convex than the slender pupa of that species.

536. **UDAIANA CYNIS**, Hewitson.

Pieris cynis, Hewitson, Ex Butt, vol. iii, pl. *Pieris* viii, fig. 54, *male* (1866).
Udaiana pryeri, Distant, Rhop. Malay., p. 301 (1885).
Udaiana androides, Hagen, Iris, vol. vii, p. 32 (1894).

Hewitson. Wallace. Butler. Kirby. Distant. Hagen as *cynis* and *androides*. Originally described from Sumatra. I have a large series of both sexes of this species in my collection from three distinct localities, the Malay Peninsula, Sumatra and Borneo. In all of these they present exactly similar and parallel variations. The males have the underside of the hindwing (1) entirely pure white, (2) with the base sprinkled with greenish-fuscous scales, (3) with the base heavily marked with a broad black band, beyond which, crossing the disc of the wing but not reaching the costa or abdominal margin, is a fuscous rather broad line or fascia, and every gradation exists between these three forms. The latter form is the *U. pryeri* of Distant, described from North Borneo. The females vary greatly in the extent of the development of the fuscous coloration on the upperside of both wings, in the palest form, which has been named *U. androides* by Hagen, this is hardly more extensive than in the male, while every gradation exists until the darkest form figured by Distant in Rhop. Malay., pl. xxvi, fig. 6, is reached. In the case of *U. cynis*, *U. pryeri*, and *U. androides* I am sure we have to do with one protean species only. In this Dr Martin entirely agrees with me for the reason that he has caught all three forms at the same time in the forest near Selesseh. *U. cynis* is found exclusively in the forest and throughout the year, but only at low elevations not higher than Namoe Oekor. The males sometimes come to wet spots on roads together with *Catopsilia catilla*, Cramer, and species of *Terias*; the females are captured on the green flowers of a low creeper in the forest. *U. cynis* never occurs in the black-soil-forests of Deli, but as soon as the red-soil-forests of Langkat and Serdang are entered there it appears at once.

537. **TERIAS HARINA**, Horsfield.

Hagen. Wallace. This is the true *Terias* of the forest, where it is found somewhat rarely frequenting flowers together with species of *Zemeros* and females of *Lycænidæ*. It is found throughout our area, with perhaps the exception of the Central Plateau, and flies throughout the year.

538. **TERIAS LIBYTHEA**, Fabricius.

Snellen as *brigitta*. Hagen as *brigitta*, var. *drona*, and *drona*. The "*Papilio*" *brigitta* of Cramer was described from "La Côte de Guinée."

It is treated by Trimen as a purely African butterfly. The original figure does not at all agree with the original figure of *T. drona*, Horsfield = *T. libythea*, Fabricius, as it has no black border to the hindwing on the upperside. Watson in Journ. Bomb. Nat. Hist. Soc., vol. viii, p. 515 (1894) says that *T. drona* as identified in the British Museum has the "marginal band of hindwing evenly narrow throughout." This is incorrect, as a glance at the original figure will show, at the costa it is broad, fining away to nothing at the anal angle. Butler states in Ann. and Mag. of Nat. Hist., fifth series, vol. xvii, p. 221 (1886) that the unique specimen described by Horsfield is a female. I doubt this, I should say it was a male, as it is clear yellow on the upperside; were it a female it would have a heavy sprinkling throughout of black dots. It therefore agrees in this character with *T. libythea*, which is defined by Watson as having the "marginal band of hindwing broad at apex and narrow at anal angle." Butler in Cat. Fab. Lep. B. M., p. 227, says that *T. libythea* is "an unspotted variety of Horsfield's *T. drona.*" From a careful examination of my series of *Terias* of this group, it appears to me that *T. libythea* (following the identification of this species in the British Museum) is the dry-season form, with *T. rubella*, Wallace, as a synonym, and *T. drona* the wet-season form, with *T. senna*, Felder, as a synonym, of one and the same species. The wet-season form (*T. drona*) alone occurs in Sumatra. In Sumatra it is found only on the Central Plateau of Tobah and Karo, and even there is not very numerous and occurs only at certain times. Though the collectors were instructed always to catch this species when they could, they only brought in specimens in December and January, when it appears to be common, and in May and July, when it appears to be rare, and not a single one in any other month, so the species in Sumatra would appear to be double-brooded.

539. TERIAS TILAHA, Horsfield.

Hagen. Sumatran specimens have a reniform mark at the end, and a W-shaped mark at the middle of the discoidal cell of the forewing on the underside. The female is paler on both surfaces than the male, of a lighter more gamboge-yellow colour, with the marginal band on the upperside of the hindwing twice as broad, narrow at the apex, very broad at the anal angle, and extending on to the disc on either side of the submedian nervure. It is the rarest *Terias* of our area, found throughout the year on the outer mountains and also in the plains, as several specimens have been obtained at Selesseh, though Dr. Hagen says that it is not found below an elevation of 500 feet. In 1887 Dr. Martin took a specimen at the Terdjoen Estate very near the sea. It must be more common in the Gayoe-lands, as the Gayoe collectors always brought it in largely.

540. Terias sari, Horsfield.

Wallace. Distant. This species is well figured by Distant, and by Snellen in Midden-Sumatra, Lepidoptera, pl. i, figs. 8, 9, *male* (1892), as *T. hecabe*, Linnæus, var. two. The Sumatran is absolutely identical with the Indian form. Both sexes have a double line at the end and a small linear marking at the middle of the discoidal cell of the forewing on the underside. The female is of a paler yellow colour than the male, with the marginal band on the upperside of the hindwing twice as broad throughout its length, posteriorly inwardly diffused and powdery. *T. sodalis*, Moore, described from the Mergui Archipelago in Lower Burma, the types of which are in the Indian Museum, Calcutta, is a synonym of *T. sari*. Moore says his species is smaller than *T. sari*, but we have Sumatran specimens quite as small, but the marginal band on the upperside of the hindwing in both sexes is certainly somewhat narrower in both sexes of *T. sodalis* than in *T. sari*, but this very poor character is not in my opinion sufficient to separate the two specifically.

541. Terias toba, de Nicéville, n. sp.

Habitat: N.-E. Sumatra.

Expanse: ♂, 1·2 and 1·6; ♀, 1·6 inches.

Description: This species has been well figured by Snellen in Midden-Sumatra, Lepidoptera, pl. i, figs. 10, 11, *female* (1892), as *T. hecabe*, Linnæus, var. one. It appears to be allied to *T. sari*, Horsfield, and has in both sexes a double line at the end, and two (instead of one) small markings towards the base of the discoidal cell. Like *T. sari*, it has the cilia of both wings black. It differs, markedly, however, from that species in its much smaller size; its very pale primrose colour (*T. sari* is dark yellow); in the very large apical brown patch on the underside of the forewing of *T. sari* reduced to a small linear brown band, and the oblique brown marking at the outer angle of *T. sari* altogether absent. The "male-mark" in this form is short, broad, and very prominent. The female is even paler yellow than the male, being almost as white as in the same sex of *T. harina*, Horsfield. The marginal band on the upperside of the hindwing is twice as broad as it is in the male, being of the same width as in the male of *T. tilaha*, Horsfield. It is possible that the male of *T. toba* has been figured by Distant in Rhop. Malay., pl. xxvi, fig. 13, *male*, as *T. senna*, Felder. True *T. senna* (see No. 538 above) belongs to quite a different group, *T. toba* being of the *hecabe* group. Described from two males and one female.

542. TERIAS ANDERSONII, Moore.

This also appears to be allied to *T. sari*, Horsfield, the males are the same size, the "male-mark" is the same, not as in the preceding species, it agrees with *T. sari* also in the markings of the discoidal cell of the forewing on the underside; differing, however, in its paler colour, though it is not as pale as the preceding species; in having on the underside of the forewing either no apical brown patch or a very small linear one, and no oblique brown marking at the outer angle as *T. sari* has. The cilia is black as in *T. sari*. It differs only from the types of *T. andersonii* now before me in its usually rather larger size and somewhat paler coloration on both surfaces. One specimen agrees in all respects with Distant's figure of *T. senna*, Felder, Rhop. Malay., pl. xxv, fig. 14, *female*, in having the markings of the underside entirely obliterated.

543. TERIAS HECABE, Linnæus.

Hagen. Snellen. Grose Smith. Wallace. Distant. This species has been well figured by Snellen in Midden-Sumatra, Lepidoptera, pl. i, figs. 6, 7 *male* [*nec* female] type (1892), see his Index to the Plates, p. 85. According to Capt. E. Y. Watson (Journ. Bomb. Nat. Hist. Soc., vol. viii, p. 509 (1894), *T. hecabe* may be known by never having "More than two streaks or spots in the discoidal cell on the underside of the forewing in addition to the reniform spot on the disco-cellular nervules." He has identified for me from Sumatra both the rainy-season form (true *T. hecabe* and *T. hecabeoides*, Ménétriès), which has "No apical brown patch on the underside of the forewing," and the dry-season form (*T. excavata*, Moore), which has at the "Apex of the forewing on the underside a more or less strongly pronounced brown patch." Seasonal forms in Sumatra, are, I believe, quite unknown, so perhaps, as in the case of *Melanitis ismene*, Cramer, the two forms, dry and wet, which are seasonal in India, occur together and without any reference to the dryness or humidity of the atmosphere in Sumatra. *T. hecabe* is numerically by far the commonest species of the genus in Sumatra, and Capt. Watson has kindly identified six different varieties of it for me, some of which he names *T. hecabeoides*, Ménétriès, *T. excavata*, Moore, *T. swinhoei*, Butler, *T. patruelis*, Moore, and *T. merguiana*, Moore. It would, I think, serve no useful purpose in our at present very superficial and inadequate knowledge of the genus as represented in the Malay Archipelago to define precisely all these varietal forms, some of which may perhaps be distinct species. It remains for a local observer to breed them carefully in large numbers from eggs laid in captivity, so as to ascertain if these varieties are seasonal forms, true species, or individual variations only. Dr. Wallace notes that "The varieties of this species are infinite over its extensive range, and cannot be profitably separated."

544. TERIAS SILHETANA, Wallace.

This species has been figured by Snellen in Midden-Sumatra, Lepidoptera, pl. ii, figs. 12, 13, *male* (1892) as *T. hecabe*, Linnæus. var. three. It seems to be rare in Sumatra, we possess but very few specimens. It may be known by having three dark streaks or spots (*T. hecabe*, Linnæus, has never more than two) in the discoidal cell of the forewing on the underside in addition to the reniform spot on the disco-cellular nervules. All our specimens are of the rainy-season form, which has the apex of the forewing on the underside unmarked with brown.

545. TERIAS TECMESSA, de Nicéville, n. sp.

Terias sari, Horsfield, var. *a*, Distant, Rhop. Malay., p. 305, n. 3, pl. xxvi, fig. 3, *male* (1885).

HABITAT: Penang, Malay Peninsula; N.-E. Sumatra.

EXPANSE: ♂, 2·1 inches.

DESCRIPTION: MALE. Of large size and rich dark yellow coloration on both surfaces. UPPERSIDE, forewing exactly as in Sumatran specimens of *T. sari*, Horsfield. *Hindwing* with the black margin broad, but a little variable in breadth, its inner edge festooned between the veins, dying away to nothing at the anal angle, the black border of about the same width as in *T. sari*. UNDERSIDE, *forewing* with a W-shaped brown marking near the base of the discoidal cell, a prominent zigzaged one across its middle, and a prominent double linear one at its outer end; a large brown apical patch as in *T. sari*, but always bearing outwardly some suffused spots of the yellow ground-colour. *Hindwing* marked as in *T. sari*, but the brown markings rather more prominent. *Cilia* of both wings black throughout.

The large apical brown patch on the underside of the forewing will at once separate it from all the named forms of *T. hecabe*, Linnæus, known to me, but the patch is precisely similar to that found in India in one of the dry-season forms of *T. silhetana*, Wallace, that species, however, having four instead of three disco-cellular markings; while the presence of two markings in the discoidal cell besides the disco-cellular one will distinguish it from *T. sari*.

Described from six males from N.-E. Sumatra and one from Penang. The female is unknown.

546. *TERIAS EUMIDE, Felder.

Grose Smith. Originally described from Celebes. Wallace gives North Celebes and the Sula Islands as its habitat, with a "var." from Batchian. We have seen nothing like it from Sumatra.

547. *TERIAS LATILIMBATA, Butler.

T. latilimbata, Butler, Ann. and Mag. of Nat. Hist., fifth series, vol. xvii, p 221, pl. v, fig 5 (1886).

Both sexes originally described from Sumatra.

548. *TERIAS BIDENS, Butler.

T. bidens, Butler, Ann. and Mag. of Nat. Hist., fifth series, vol. xvii, p. 222, pl. v, fig 7, *female* (1886).

Originally described from Sumatra from a female.

549. *TERIAS SEMIFUSCA, Butler.

T. semifusca, Butler, Ann. and Mag. of Nat. Hist., fifth series, vol. xvii, p. 222, pl. v, fig. 8, *female* (1886).

Originally described from Sumatra from a female. We are unable to recognise any of these species of Mr. Butler's.

All *Terias* are weak on the wing, fly slowly, and never leave the ground for a high flight. They are all, with the exception of *T. harina*, Horsfield, found in open places, in gardens, on roads, and near houses, the males frequently assembling in large numbers on wet spots on roads and by the sides of rivers and streams. *T. hecabe*, Linnæus, sometimes appears in swarms, and its larva may then prove very destructive to *Cassia* plantations. *Cassia florida*, Linnæus, is its favourite food-plant, on which the eggs are sometimes deposited singly as are the eggs of the *Catopsilias*, but sometimes on a single leaf a large number are placed in a rhomboid shape. In the latter case the green pilose larva with a yellowish-white lateral streak and a black head (all the larvæ of *Catopsilias* have a head concolorous with the body) live in societies, and the pupa are also suspended sociably, a fact not previously we believe observed in *Lepidoptera*. If the pupa hang from leaves they are green, if near the flowers of the *Cassia* they are yellow, and if the caterpillars leave the food-plant and pupate on certain high *Gramineæ* they are blackish-brown like the seed of the grass. As the pupæ are arranged at regular distances apart, the deception is a very good one and must greatly protect them, as men, animals and birds at a superficial glance would take these pupæ to be only withered flowers of the *Cassia* or ripe seeds of the grass. After six days in the pupa state the imago emerges. Though so weak and slow in flight, they are very clever in avoiding being caught by the net.

550. DERCAS GOBRIAS, Hewitson.

Grose Smith. Wallace. Staudinger. Kirby. Distant. Hagen. Is rather rare, and occurs from Bekantschan to the Central Plateau. Collectors never bring in more than two or three specimens at one time. We have specimens caught from February to August only.

551. IXIAS LUDEKINGII, Vollenhoven.

Hagen. Wallace. Kirby. Originally described from a male from the mountainous country in the interior of Sumatra. It is very rare, Dr. Martin has only two males taken in January of the last year of his residence in Sumatra, one caught in the Battak mountains at a high elevation, the other taken near Bohorok near the western boundary of our area, where also Dr. Dohrn's collector obtained several males.

552. IXIAS FLAVIPENNIS, Grose Smith.

I. flavipennis, Grose Smith, Nat. Wand. in the East. Arch., p. 275 (1885); id., Grose Smith and Kirby, Rhop. Ex., p. 2, n. 3, pl. *Ixias* i, figs. 6, 7, *male* [*nec female*] (1888); id., Weymer, Stet. Ent. Zeit., vol. liii, p. 121 (1892).

Thestias flavipennis, Snellen, Tijd. voor. Ent., vol. xxxiv, p. 335, pl. xvi, figs. 1, 2, *male*; 3, 4, *female* (1892).

Ixias pyritis, Weymer, Stet. Ent. Zeit., vol. xlviii, p. 13, n. 11, pl i, fig. 4, *male* (1887).

Hagen. Snellen. Originally described from Sumatra where it alone occurs and only at high elevations, from Soengei Batoe to the Central Plateau, and the males are very common on the sandy banks of little streams; the females, very rare and taken in the forest only, come to hand in the proportion of one to a hundred males. They probably escape capture by the collectors owing to their white colour, being mistaken for the common species of *Catophaga* and *Hiposcritia*. Occurs throughout the year, Dr. Martin has specimens taken in every month. Both Drs. Martin and Hagen have obtained it from the Gayoe- and Alas-lands, where the butterfly possibly occurs at a lower elevation than in the Battak mountains.

553. CATOPHAGA NERO, Fabricius.

Grose Smith. Snellen. Hagen. Wallace. Standinger. Semper. A very variable species in both sexes. Males from Sumatra have the ground-colour on the upperside of both wings "golden-yellow" (*Appias* *figulina*, Butler), rich orange, or deep crimson, with an equally inconstant development of the black markings along the veins, and of the discal fascia. The females also shew somewhat similar variations. Males are not rare in large forest, and frequent wet spots on roads. Females are very rare, Dr. Martin has only four specimens. It is found throughout the year and over the whole of our area except at the higher elevations; even occurs near the sea, Dr. Martin having taken it at the Saentis Estate. It flies very rapidly if pursued. The *A. nebo*, Grose Smith and Kirby, Rhop. Ex., pl. *Appias* i, figs. 1, 2, *male* (1894) described from Upper Burma, and of which I possess both sexes from the same locality taken in April, is I believe only a spring dry-season form of *C. nero*. Other synonyms of this species appear to be *Tachyris galba*, Wallace, described from N. India; *Pieris domitia*, Felder, described from Luzon; *Pieris zamboanga*, Felder, described from Mindanao; *Pieris asterope*, Felder, described from Luzon; *Appias mindanensis*, Butler, from Mindanao; and perhaps the *Tachyris nero*, var. *palawanica*, Staudinger, described from Palawan, is hardly separable.

554. Catophaga hippo, Cramer.

Grose Smith as *enarete* and *lyncida*. Hagen as *lyncida* and *hippo*. Wallace. Staudinger as *lyncida*, var. *hippo*. Distant as *enarete*, var. *C. lyncida* was described and figured by Cramer from a male specimen, the habitat given being "Surinam," which, as in nearly all similar cases, was probably a *lapsus calami* for Sumatra. *C. hippo*, Cramer, was figured and described from a female specimen, the habitat given is "The west coast of Sumatra." These two names may perhaps represent opposite sexes of one and the same species; but as Wallace says that "*Tachyris*" *hippo* "Is distinguished from its allies ["*Papilio*" *lyncida*, &c.] by the clear ochre-yellow colour of the under surface of the lower wings in both sexes," I have used *C. hippo* for the species, though *C. lyncida* is the older. The latter name applies to the Javan form, which has the ground-colour of the underside of the hindwing entirely white. The *C. enarete* of Boisduval was described from the "Moluccas," probably in error, and is recorded by Dr. Wallace from Borneo, and may perhaps be kept distinct from *C. hippo*, as it has the outer black margin to the hindwing on the underside in the male broader than in that species. *C. hippo* in Sumatra is a constant species, and does not exhibit the great seasonal dimorphism which is found in the Indian forms. It is much commoner than *C. nero*, Fabricius, and the females are not very rare. It is found throughout the year, but only in or near the forest. The males often assemble twenty or thirty together on a small puddle on the road, the female is found in the forest hunting for flowers for herself, or for the food-plant of her larva. Dr. Martin has often seen them on the same flower that is frequented by the female of *Udaiana cynis*, Hewitson. He has bred the butterfly from the larva found feeding on a small shrub called by the Battaks "Daoen Taugla," which grows on the banks of rivers. The larva superficially does not greatly differ from the larvæ of the *Catopsilias*, but in shape is more slender. The pupa, however, is quite different, with a stellar indented thorax. The imago emerges in seven days. Only bred females have the beautiful olive-green colouring; almost as soon as they fly, this colour is bleached out. *C. hippo* occurs all over our area, and is one of our most common butterflies.

555. CATOPHAGA LEIS, Hübner.

Hagen as *amasene* and *leis*. Distant. Wallace as *alope*. Grose Smith as *alope*. I follow Mr. Distant in his identification of this species, not having Hübner's Zutraege Ex. Schmett. to consult; also in considering *C. alope*, Wallace, from India, Sumatra, Java, and Borneo, to be a synonym. *C. amasene*, Cramer, described from China, is superficially like the male of *C. leis*, and probably Dr. Hagen identified this species under that name. Semper identifies *C. leis* as "*Appias*" *agave*, Felder, from the Philippines. In Sumatra *C. leis* is restricted to the plains, and is only found in forest throughout the year. The female is very rare; the male comes to damp spots on forest roads as does *Catopsilia crocale*, Cramer, and many other *Pierinæ*. Common near Paya Bakong, the small forest reserve mentioned in the Introduction (page 359). Distant has well figured the male and two forms of the female from the Malay Peninsula.

556. CATOPHAGA PAULINA, Cramer.

Grose Smith as *albina* and *paulina*. Hagen as *paulina* and *albina*. Semper identifies this species from the Philippines as "*Appias*" *albina*, Boisduval. The male of *C. paulina* from Sumatra exhibits the same variations as it does in India, some specimens on the upperside of the forewing having a marginal black thread only, others have the apex widely, the outer margin decreasingly to the outer angle, powdered with black scales, while there is found every gradation between these two extremes. There are three distinct forms of female, the first and second are white on the upperside of both wings, the third is dark primrose-yellow-coloured; on the underside of both wings the first is of "A glossy tint of pearly-white" as Wallace well expresses it, the second has the apex of the forewing and the entire hindwing rich ochreous, the third has these areas of a different shade, ochreous diluted with pearly-white, the discal area of the forewing primrose-yellow, with a broad dark gamboge-yellow area occupying the basal two-thirds of the discoidal cell. Dr. Martin thinks that *C. leis*, Hübner, and *C. paulina* may be one and the same species. I keep them distinct as I can from my Sumatran specimens separate them easily into two species in both sexes. The male of *C. leis* has on the upperside of the forewing an inner apical broad black band (*vide* Distant's figure) which is quite wanting in *C. paulina*; the female of *C. leis* has the base of the forewing on the upperside more broadly black especially at the inner margin than in *C. paulina*, the base of the hindwing also black, in *C. paulina* it is white, on the underside of the hindwing in *C. leis* there is a submarginal series of suffused dark spots and the margin itself is also blackish, while in *C. paulina* the hindwing is concolorous throughout. In spite however of these apparently good differences it is quite possible that specimens intergrading between the two species may exist in Sumatra as they certainly do in India. It is an insect of the alluvial plain and occurs in the forests, the males on roads with *C. leis*, Hübner, the females rarer and within the forest. It flies throughout the year, and is common at Paya Bakong and near Selesseh, not found higher than Bekantschan.

557. HIPOSCRITIA PANDIONE, Hübner.

Hagen. Staudinger. Grose Smith as *lelage* [sic]. The *H. lalage* of Doubleday, from the Himalayas, Assam, and Burma, is quite distinct from the present species. Males of *H. pandione* are very common at high elevations from Soengei Batoe to the Central Plateau. The Battak collectors often brought in hundreds of males, but never a female. Occurs throughout the year, as we have specimens caught in every month. Of late the Battaks received orders not to catch any more specimens.

558. HIPOSCRITIA LEPTIS, Felder.

Staudinger. Distant as *leptis*, var. *plana*. Hagen as *leptis*, var. *plana*. The *Appias plana* of Butler was described from Malacca and Borneo, and cannot be retained as distinct from the present somewhat variable species. *H. leptis* is rather rarer than *H. pandione*, Hübner, and occurs throughout the year occasionally near Selesseh but commonly at Bekantschan. The female is very rare, Dr. Martin possesses three only, which present quite distinct indications of an obscure submarginal fascia on the underside of the hindwing, which, however, is absent in three females from Sumatra and one from Java in my collection.

559. HIPOSCRITIA CARDENA, Hewitson.

Grose Smith. Snellen. Wallace. Distant. Hagen. Quite as common as *H. pandione*, Hübner, and occurs in the same localities throughout the year. No female obtained.,

560. SALETARA NATHALIA, Felder.

Grose Smith. Snellen as *panda*. Hagen. Wallace. Distant as *nathalia* and *panda*. Mr. Distant records both *S. panda*, Godart, and *S. nathalia* from the Malay Peninsula and Sumatra. Dr. Wallace considers that *S. panda* is confined to Java, while *S. nathalia* also occurs in Java, and in the Malay Peninsula, Sumatra, Borneo, the Philippine Isles, and Celebes. *S. panda* in the male is known by the pale primrose-yellow colour of the upperside, while *S. nathalia* is "creamy white with a faint greenish tinge." I greatly doubt if this character is sufficiently constant to separate the two species, I have one specimen from Sumatra which is quite intermediate between them. Mr. Distant considers that *S. nathalia* having five [three according to my way of computing them] subcostal nervules to the forewing in the male, while *S. panda* has only four [two], while the females of both species has four [two], is a character by which the two species may be separated, though he admits that he has a specimen of *S. nathalia* in which one wing has the neuration of *S. nathalia*, while the other has that of *S. panda*. In my series of thirty males of this genus, I have one from the Philippines and one from Singapore with two subcostal nervules only, one from Singapore, one from Great Nicobar, and one from Little Nicobar with two subcostal nervules on one side only and three on the other, while all the rest have three subcostal nervules on both sides. The females seem to be more constant, having two subcostal nervules only in all the specimens I have been able to examine. Neuration certainly will not suffice to keep these two species distinct. I use Felder's name for the species as most of the writers on Sumatran butterflies have done so, and as the majority of male specimens from thence agree with the description of that species rather than with that of *S. panda*, the older name. It has been beautifully figured by Heer P. C. T. Snellen as *Pieris panda*, Godart, in Midden-Sumatra, Lepidoptera, pl. ii, figs. 9, 10, *male*; 6, 7, *female* (1892). It is found only in the forest at low elevations, not higher than Namoe Oekor as far as we have noticed, but Dr. Hagen mentions its occurrence on the Central Plateau. Not at all common, and flies from March to July. The *Saletara schoenbergi* of Semper, described from Nias and South-East Borneo, also from Great and Little Nicobar in my collection, has been described and figured by

Snellen in Tijd. voor Ent., vol. xxxviii, p. 24, pl. i, fig. 3, *male* (1895), as *Pieris panda*, Godart, var.

561. Hebomoia borneensis, Wallace.

Grose Smith as *glaucippe*. Snellen as *glaucippe*. Hagen as *glaucippe*, var. *sumatrana*, Hagen; and *glaucippe*, var. *sumatrensis*, Hagen. Wallace as *glaucippe*. Distant as *glaucippe*. As will be seen above, all authors have recorded this species as *H. glaucippe*, Linnæus, except Dr. Hagen, who in his first Sumatran paper calls it *H. glaucippe*, var. *sumatrana*, and in his second paper *H. glaucippe*, var. *sumatrensis*, for the reason that other local races have been named *H. celebensis*, Wallace, *H. borneënsis*, Wallace, *H. philippensis*, Wallace, and *H. javanensis*, Wallace [nec *javaensis*, Hagen]. But Dr. Hagen's names cannot stand, as the Sumatran race is identical with the Bornean one which has already been named, and has the orange apical area on the upperside of the forewing in the male reduced to a patch half as large as that found in true *H. glaucippe* from North India, Burma, and the Malay Peninsula. The South Indian and Ceylonese form strangely enough agrees with the Javan, and should therefore be known as *H. javanensis*, Wallace. *H. borneënsis* is rare in our area. Dr. Martin has only once at Namoe Oekor captured a specimen himself, and Dr. Hagen records only two specimens from Sumatra. These three specimens were observed by their captors to settle quite suddenly on a low shrub with folded wings, having descended from a high and rapid flight. From Selesseh, Bohorok, and the outer ranges of the Battak mountains a few specimens have been obtained, including two females only; but on the western boundary of our area it must be very common, as the Gayoe collectors brought in hundreds of males. It flies from March to August, but is most abundant in May.

562. Nepheronia valeria, Cramer.

Wallace. Staudinger. Hagen. Semper as *lutescens*. *N. valeria* was originally described from a male from Java. *N. lutescens*, Butler, was originally described from a male from Borneo. Wallace, while retaining the Bornean form under *N. valeria*, says that the male has the forewing rather more elongated than in the typical Javan form, with a slightly concave outer margin. I have a large series of both sexes of *N. valeria* from the Malay Peninsula (called *N. lutescens* by Distant), Sumatra, Nias, Java, and Borneo. I find both sexes in all localities slightly variable, and I do not think it is possible to create (in the sense of separating them off into local races with distinctive names) local races for them. *N. valeria* is a very quick flying and restless insect is not very rare at Selesseh and in the outer hills as far as Bekantschan, and is found from March to September, but not in any other month. The female is decidedly rare, and always has the basal markings on the upperside of both wings gamboge-yellow. It is a beautiful mimic of *Danais aspasia*, Fabricius.

563. HUPHINA NADINA, Lucas.

Snellen. Hagen as *remba*. The *Huphina remba* of Moore is a quite distinct species, and is confined to South India and Ceylon. *H. nadina* is very common at high elevations, at Soengei Batoo and on the Central Plateau, on the sandy banks of hill streams throughout the year. The female is very rare, and Dr. Martin has only obtained two specimens in thirteen years.

564. HUPHINA NERISSA, Fabricius.

Hagen as *Pieris nerissa*, Fabricius, var. *sumatrana*, Hagen. *H. nerissa* appears to be the oldest name for the species of this group, and was originally described from China, Butler records it from Hong-Kong, the Indian forms of which, generally known as *H. phryne*, Fabricius, appear to be highly variable and subject to seasonal dimorphism in all localities where the climate exhibits two well-marked seasons, a wet and a dry. Even specimens from a limited area and an equable climate like the Battak mountains in Sumatra shew considerable variation in the coloration of the underside of both wings, some examples being much richer yellow than others, and the black lining to all the veins greatly differing in width. It is much rarer than the foregoing species, but is found in the same localities from April to September, most numerous in May and July. Dr. Martin possesses no female.

565. HUPHINA LEA, Doubleday.

Grose Smith as var. *naomi*. Snellen. Hagen as *lea* and *amalia*. Wallace as *amalia*. Kirby as *amalia*. Distant as *amalia*. The "*Pieris*" *naomi*, Wallace, was described from Lombock and Flores, and is not at all likely to occur in Sumatra. "*Pieris*" *amalia*, Vollenhoven, was originally described from Sumatra and Banca, a female from the latter island being figured. Vollenhoven gives for "*Pieris*" *lea* the islands of Borneo and Banca, so that both species according to him occur in the latter island. Wallace keeps the two species distinct, and gives Borneo and Banca for *H. lea*, Singapore and Sumatra for *H. amalia*. I have a large suite of specimens of *H. lea* from Burma, the Malay Peninsula, Sumatra and Borneo, and am unable to find any constant character by which *H. amalia* can be distinguished from it.

Males of *H. lea* are common in the forests of both the plains and mountains, and we have specimens taken at Selesseh and Bekantschan from February to October, but none from the remaining months. The female is decidedly rare.

566. *HUPHINA JUDITH, Fabricius.

Hagen. *H. judith* is confined, as far as I am aware, to Java, where it replaces *H. lea*, Doubleday, of Borneo, Banca, Sumatra, the Malay Peninsula, and Burma. The occurrence of *H. judith* in Sumatra, is, I think, more than doubtful.

Subfamily PAPILIONINÆ.

567. TROIDES (*Trogonoptera*) BROOKIANA, Wallace.

Grose Smith as *brookeana* [sic]. Snellen as *brookeana* [sic]. Hagen as *brookeana* [sic]. Wallace as *brookeana* [sic]. Rothschild as *brookianus* [sic]. Distant as *brookeana* [sic]. Staudinger. Kirby. Occurs throughout the year in the plains and outer hills, not much higher than Bekantschan, at Selesseh, and even near Bindjei, in Padang Bedagei and Asahan down the coast; abundant at Quala Loemoerak near Bohorok, where the males are fond of frequenting a hot sulphur spring. The female is very rare, Dr. Martin obtained only three.

568. TROIDES (*Pompeoptera*) HONRATHIANA, Martin.

Ornithoptera honrathiana, Martin, Berl. Ent. Zeitsch., vol. xxxvii, p. 492 (1892); idem, id., Nat. Tijd. voor Neder.-Indië, vol. liii, p. 332, n. 1 (1893).

Martin. Hagen. Rothschild as *T. vandepolli honrathianus.* This is a local race of "*Papilio*" *van de polli*, Snellen, Tijd. voor Ent., vol. xxxiii, p. 22 (1890), from Java, differing therefrom in the abdomen in both sexes being very hairy and entirely black instead of more or less yellow beneath. It is found only on the Central Plateau, and never below 3-4,000 feet, and is not so rare as *T. cunifer*, Oberthür. The egg is salmon-coloured. The types were taken in December, but it probably flies all the year round.

569. TROIDES (*Pompeoptera*) HELENA, Linnæus.

Cramer as *minos*. Snellen. Grose Smith as *minos*. Kirby as *minos*. Hagen as *hephæstus*. Wallace as *pompeus*. *T. pompeus*, Cramer, by which name this species is generally known, was originally described from a female from Batavia in Java. *T. minos*, Cramer, was originally described from a female said to have come from the West Coast of Sumatra, but is really confined to S. India. *T. helena* is common throughout the year in the plains of Sumatra, but does not occur probably much higher than Namoo Oekor. It flies quite close to the sea, as Dr. Hagen took it plentifully in his garden near Laboean. There are two forms of female; I, with somewhat light, whitish forewing and very black hindwing, which is the rarer; II, with entirely black forewing, but with only small black spots on the hindwing, which is the commoner. Every gradation between these two extreme forms exists in Sumatra as elsewhere. Rothschild records the typical form from S.-E. Sumatra; also (b^2), ab. *pluto*, Felder, from S.-W. Sumatra; and (*d*), *T. helena cerberus*, Felder, from Sumatra.

570. TROIDES (*Pompeoptera*) AMPHRYSUS, Cramer.

Grose Smith. Hagen as *amphrysus*, var. *rubricollis* [sic]; and *amphrysus*, var. *ruficollis*. This species was originally described from a male from Batavia in Java. *T. ruficollis*, Butler, was described from Malacca in the Malay Peninsula. I can find no constant character by which to separate these two species, and Mr. Butler in his original description of the latter does not say how they are supposed to differ. Heer P. C. T. Snellen says also that the two species are identical. It occurs in Sumatra throughout the year in the plains and on the outer ranges of the hills, but not higher than Bekantschan, and is commoner than *T. helena*, Linnæus. Dr. Martin has twice bred it, the larva feeding on a creeper with large trilobate leaves. The egg is spherical and yellow, and in three or four days the caterpillars emerge. When full grown the larva is of a coffee-brown colour, and has on each segment four, five, or seven fleshy processes, those on the first four segments (omitting the head) are apically thickened and rounded and are bent backwards, on the other segments they are directed forwards. The larvæ devour not only the leaves, but also the bark and soft shoots of their food-plant if there are no more leaves to eat, and make a very audible noise while eating, just as the larvæ of large *Saturnias* do. They are very delicate, and especially so when they have fixed themselves for their transformation to the pupa state, when on no account should they be touched. The pupa is yellow, is dorsally notched, and is suspended by a black median silken girth. If the pupa is touched, disturbed in any way, or even blown upon, it makes quite a loud noise by moving the abdominal segments one over the other, which noise is so loud that it is probably sufficient to scare away some of its enemies. After from 26 to 29 days the imago emerges, which is the longest pupal rest known to us for purely tropical butterflies—at least as regards all such species as we have bred. Even the large *Papilios* such as *P. memnon*, Linnæus, do not remain more than 15 or 16 days in the pupal stage. Rothschild records (*c*) *T. amphrysus flavicollis*, Druce, (b^2), ab. *ruficollis*, Butler, from Sumatra.

571. Troides (*Pompeoptera*) cuneifera, Oberthür.

Ornithoptera amphrisius, Fabricius, ab. *cuneifera*, Oberthür, Etudes d'Ent., vol. iv, p. 110, n. 9 (1879).

Papilio (*Ornithoptera*) *ritsemæ*, Snellen, Notes from the Leyden Museum, vol. xi, p. 153 (1889).

Ornithoptera ritsemæ, var. *sumatrana*, Hagen, Iris, vol. vii, p. 19, n. 5 (1894).

Hagen as *ritsemæ*, var. *sumatrana*. Found from January to July only at high elevations to the south of Bekantschan and at Soengei Batoe. It is rare, as Dr. Martin in thirteen years obtained only three males and two worn females. He notes "That the Sumatran race of *T. ritsemæ*, originally described from Java, differs from Javan specimens in not having the two cuneiform velvety dark brown spots on the upperside of the abdomen; the forewing is coloured and marked exactly like Javan examples; the hindwing has the submarginal row of dusky powdered spots so very conspicuous and complete in Javan specimens very slightly indicated, faint, and reduced to one or two only, in Sumatran examples." Rothschild does not allow this species specific rank, but gives it in his exhaustive paper in "Novitates Zoologicæ," vol. ii, p. 232 (1895), entitled "A Revision of the *Papilios* of the Eastern Hemisphere, exclusive of Africa," under *Troides amphrysus*, Cramer, as (*d*), *T. amphrysus sumatranus*, Hagen. Unfortunately this paper only reached me when the whole of the present article was in print, so that on this occasion I am not able to give it full justice.

All *Troides* are true inhabitants of the forest, but the yellow species (*Pompeoptera*) in both sexes are very fond of flowers, *Hibiscus*, *Ixora*, and *Poinciana pulcherrima*, and so approach houses and are seen in the gardens, but they never settle on roads. *T. brookiana* (*Trogonoptera*) on the contrary never settles on flowers, but only on damp spots on roads and also near houses on manure heaps and kitchen middens. All of them were very appropriately named generically *Ornithoptera* by Boisduval, as on the wing they really look very much like birds, especially *T. brookiana*, which when sailing high over a road or in the forest has a most striking resemblance to the small and common Swift of the tropics. Usually they fly slowly, but if pursued their flight becomes extremely rapid, so that they are soon borne out of reach and sight. They never entirely settle on flowers, but seize them with their forelegs, they float above the flower by gently moving the wings for a few seconds, when they seek another. They are strong fliers, as the females in especial have to make long journeys to find the rare food-plant, when so flying they keep high up in the air, doubtless to overlook a large stretch of jungle. All *Troides* are early risers, and are already out at 7 o'clock in the morning; in the hottest hours of the day they are rarely seen, but appear again late in the evening at 5 or 6 o'clock, when with the exception of some *Satyrinæ*, *Amathusiinæ* and *Hesperiidæ* all other butterflies have gone to rest long ago. Mr. Walter Rothschild refers to the Malay Peninsula local race as *T. brookianus albescens.*

572. PAPILIO (*Menelaides*) ANTIPHUS, Fabricius.

P. antiphus, Hagen, Iris, vol. vii, p. 20, n. 12, pl. i, fig. 1, *larva* (1894).

Grose Smith. Snellen as *anthipus* [sic]. Hagen. Staudinger. In Trans. Linn. Soc. Lond., first series, vol. xxv, p. 20 (1865), Dr. Wallace records *P. diphilus*, Esper, = *P. aristolochiæ*, Fabricius, from Sumatra, ut this probably in error, as on page 43, n. 26 (*l. c.*) he omits Sumatra from the habitat of the species. It is not a little remarkable I think that *P. diphilus* should occur commonly in the Malay Peninsula and Java, between which Sumatra lies, but not in Sumatra itself, it being replaced by the present species. In Java both *P. diphilus* and *P. antiphus* are found. In Sumatra *P. antiphus* flies in the plains throughout the year and quite near the sea, is common at Laboean and Terdjoen, but certainly not much higher than Namoe Oekor. It is seen on roads, in gardens and orchards, near rivers, is plentiful on the above-mentioned *Veronica*-like blue flower, but not in large forest. It flies slowly and sails near the ground, and is the most common *Papilio* of Sumatra next to *P. polytes*, Linnæus. The larva is velvety black, with numerous black red-tipped fleshy tubercles or processes, the sixth segment is milky-white much as in *P. erebus*, Wallace. It feeds according to Dr. Hagen on the same *Piperacea* as *P. erebus*, Wallace, but Dr. Martin has also bred it on the common *Aristolochia indica*, Linnæus, and notes that the full-fed caterpillar feeding on the latter plant is reddish-brown throughout without the milky-white saddle-mark on the sixth segment. The pupa is brown, with blunt notches and protuberances. This larva, like that of *Troides amphrysus*, Cramer, eats not only the leaves but also the stalks of the food-plant. Rothschild does not consider *P. antiphus* to be a species distinct from *P. aristolochiæ*, but records it from Sumatra as (*g*), *P. aristolochiæ antiphus*, Fabricius.

573. *PAPILIO (*Menelaides*) COON, Fabricius.

Grose Smith. Wallace. Distant. There are typical specimens of *P. cöon* in Dr. Staudinger's collection from Padang in Western Sumatra, though the locality is somewhat doubtful, as the specimens may have been obtained from old collections with wrong labels given by dealers. It occurs also in Java and Borneo.

574. PAPILIO (*Menelaides*) DELIANUS, Fruhstorfer.

P. doubledayi, Wallace, var. *delianus*, Fruhstorfer, Ent. Nach., vol. xxi, p. 196 (1895).

Hagen as *doubledayi*. Originally described from Deli in Sumatra. Wallace gives *P. cöon*, Fabricius, from Sumatra, Java, and Borneo, and says that *P. doubledayi*, Wallace, the Indian form, differs from it in having the markings red instead of yellow. The Sumatran form in both sexes has the markings at the anal angle of the hindwing distinctly red, while *P. cöon* from Java has them equally distinctly yellow. The abdomen of our Sumatran examples is, however, more yellow than red. We have thus true *P. coön* occurring in Sumatra, and also an intermediate form between that species and the continental *P. doubledayi*, shewing the exact region where the one species is gradually becoming transformed into the other. *P. delianus* is rare in the forests of the plains and outer hills, is found at Selesseh, Namoe Oekor, and as high only as Bekantschan. It chiefly frequents the flowers of high trees and so is seldom caught. It has a fluttering but quick flight. Dr. Martin has specimens from so far south as Asahan. Rothschild does not allow *P. delianus* full specific rank, but records it is *P. cöon*, Fabricius, (*d*), *P. doubledayi delianus*, Fruhstorfer.

575. PAPILIO (*Menelaides*) NEPTUNUS, Guérin.

Hagen as *neptunus*, var. *sumatrana*, Hagen. The Malayan Peninsula form of *P. neptunus* as figured by Distant has four crimson spots on both sides of the hindwing in the male, while the Sumatran form has only two; the female has three spots on both sides in the Malayan Peninsula form, while the Sumatran has two on the upperside and three on the underside. In all other respects the species from these two localities agree as far as I can see. I have not seen specimens from Borneo, from whence *P. neptunus* is recorded by Wallace. It is certainly one of the remarkable butterflies of the world; the anal half of the abdomen in both sexes being of a bright chrome-yellow colour is in unique and startling contrast to the rest of the black abdomen and the black wings with the crimson spots on the hindwing. No doubt this staring yellow-tipped abdomen serves as a very efficient danger-signal or warning-colour to the enemies of butterflies to leave this particular species severely alone, the butterfly being obviously a protected one and with a very strong scent. It is quite as rare as *P. delianus*, Fruhstorfer, and is found in the same localities. Its flight is very slow and sailing, always high in the air and out of reach of the net. It is almost impossible to obtain perfect specimens. Rothschild records this species from Sumatra as *P. neptunus*, Guérin, (a^2), ab. *sumatranus*, Hagen, and notes that "This aberration is *not* confined to Sumatra, but seems to be there the usual form."

576. *PAPILIO (*Pangerana*) PRIAPUS, Boisduval.

Grose Smith. Wallace. Kirby. As far as I am aware, this species is confined to Java and Borneo (Rothschild, however, says that it "Does certainly not occur in Borneo"), but it is possible that it may be found in the extreme south-east of Sumatra adjoining Java. Dr. Wallace places it in the *memnon* group, but as the males differ greatly in shape from all the species of that group, and moreover have the abdominal margin of the hindwing folded over anteriorly twice as in the species of the *nox* group, *P. priapus* appears to me to be better placed in the subgenus *Pangerana*, Moore, of which *Papilio varuna*, White, is the type, and which will probably embrace *P. nox*, Swainson, and its allies. All the species of this group, as well as all *Troides*, have as imagines a very strong scent, and are certainly highly protected.

577. PAPILIO (*Pangerana*) SYCORAX, Grose Smith.

P. (*Pangerana*) *sycorax*, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. viii, p. 54, n. 15, pl. M, fig. 1, *male* (1893).

Grose Smith. Distant. Hagen. Originally described from Sumatra, but found also in the Malay Peninsula. In Sumatra it flies from Bindjoi to south of Bekantschan, but not on the Central Plateau. We have numerous specimens from Selesseh, and Dr. Martin took it himself at Quala Minchirim near Bindjei, and at Roemah Kenangkong near Toentoengan, throughout the year. Dr. Hagen has quite recently caught it in Kedjang in Southern Sumatra. It has a bold and high flight like a *Troides*, and is not easily captured, but in the forest near Selesseh there was a tree of *Jambosa aquæa*, Rumph., in flower, on which in July, 1893, the collectors obtained considerable numbers of both sexes by using a long bamboo-handled net. *P. erebus*, Wallace, *P. sycorax*, and *P. hageni*, Rogenhofer, are all apparently commoner in the female than in the male sex, which is the reverse of nearly all other species of *Papilio*. Herr Puttfarcken has observed a female of *P. sycorax* depositing eggs on a lime tree (*Citrus* sp.) at Bandar Quala in Serdang.

578. PAPILIO (*Pangerana*) HAGENI, Rogenhofer.

P. (*Pangerana*) *hageni*, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. viii, p. 55, n. 16, pl. M, fig. 2, *female* (1893); idem, id., Journ. A. S. B., vol. lxiii, pt. 2, p. 45, n. 89, pl. iv, fig. 6, *male* (1894).

Rogenhofer. Hagen. Originally described from Sumatra, where it flies throughout the year on the Central Plateaus of Tobah and Karo only rarely, the male even rarer than the female. Dr. Hagen has seen it on the wing, and describes the flight as "*memnon*-like;" it frequents the flowers of *Pavetta*. This butterfly as well as *P. sycorax*, Grose Smith, by reason of their curious white wigs proved very attractive to the Malay collectors, so they awarded them the name "Kapala Putih," which means "White Head." It may however have been due to the fact that they received an extra douceur for every Kapala Putih they caught that they took such interest in these two particular species.

579. PAPILIO (*Pangerana*) EREBUS, Wallace.

P. erebus, Hagen, Iris, vol. vii, p. 26, n. 25, pl. i, fig. 2, *larva* (1894).

Hagen as *noctis* and *erebus*. The *P. noctis* of Hewitson appears to be a distinct species confined to Borneo. *P. erebus* occurs in Sumatra throughout the year, as we have specimens caught in every month. It is absolutely restricted to the forest, and even there does not go to roads or rivers, but flies slowly through the thickest undergrowth, where it avoids the net very cleverly by its highly irregular and erratic flight, and by dodging amongst the bushes, consequently really perfect specimens are hardly ever obtained. The males are much rarer than the females, but may sometimes be caught on the borders of the forest on the sweet smelling *Veronica*-like blue flower of a small tree. The larva has been figured by Dr. Hagen, is brown with black markings, the sixth and seventh segments with a white saddle-like band, and the whole body is furnished with long fleshy tentacles very similar to those in *Troides*. It feeds on a *Piperacea* called "Dahoen Peandang" by the Malays. Dr. Martin saw three larvæ in Dr. Dohrn's possession in February, 1895. The pupa, according to Dr. Hagen, is exactly like that of the Javan *P. nox*, Swainson.

580. PAPILIO (*Araminta*) DEMOLION, Cramer.

Grose Smith as *demoleon* [sic]. Snellen as *demolion*, Linnæus [sic]. Hagen. Wallace. Staudinger. Distant. Flies from March to July in the forests of the outer hills, from Selesseh to south of Bekantschan; is rather rare in our area; the males have a very quick and restless flight and frequent flowers, on which they do not settle, but abstract the honey while hovering. The larva feeds on *Citrus*, and is very similar to that of *P. polytes*, Linnæus, but is of a darker green colour. In Java it is very plentiful near Semarang.

581. **Papilio** (*Charus*) **helenus**, Linnæus.

Grose Smith. Snellen. Hagen. Wallace. Butler. Distant. Dr. Wallace separates off the Sumatran and Javan form of *P. helenus* from the North Indian form as a "Local form *b*," differing in being "Smaller; the third and fourth lunules from the anal angle beneath very small or quite absent." Next to *P. polytes*, Linnæus, and *P. antiphus*, Fabricius, this is our most common *Papilio*, a true inhabitant of the forest, found over the whole of our area, even on the Central Plateau, but most plentiful on the outer hills. The male has a quick and powerful flight, and frequents flowers and wet spots on forest roads. The female is rarer, and must be looked for in the forest when depositing her eggs. The larva is most common in February on different species of *Citrus*, it is superficially very similar to that of *P. memnon*, Linnæus, but is somewhat smaller and has brownish-red lateral streaks. The pupa is smaller and much more slender, but is coloured like that of *P. memnon*. The imago emerges in from 14 to 15 days. Rothschild records this species from Sumatra as (*e*), *P. helenus palawanicus*, Staudinger.

582. **Papilio** (*Charus*) **iswara**, White.

Hagen. Very rare in our area, more common on the western boundary, as most of the specimens received have been from the Gayoe-lands. Occasionally taken at Selesseh and Besitan. Found in the plains and outer hills. During a short collecting trip in Indragiri in the middle of Sumatra, Dr. Friedl Martin found this species very plentifully in February, 1895, but not a single specimen of *P. helenus*, Linnæus, was observed.

583. **Papilio** (*Charus*) **nephelus**, Boisduval.

Grose Smith. Hagen as *albolineatus*, Fabricius [sic]; *nephelus*; and *nephelus*, var. *saturnus*. Wallace. Staudinger. Distant as *nephelus*, var. *saturnus*. Forbes as *saturnus*. Butler as *saturnus*. Distant notes that in a Sumatran specimen of this species in his collection "The pale stramineous markings above are more or less shaded with dark ochraceous." This remark probably applies to a female. *P. albolineatus*, Forbes, was described from Borneo, and is figured in Aid, vol. ii, pl. clxvi, fig. 1. We have seen no specimen of it from Sumatra, though Dr. Hagen has recorded it from thence. *P. nephelus* is rarer than *P. helenus*, Linnæus, and occurs throughout the year in the plains and on the outer hills, but not on the Central Plateau. It is also a true forest butterfly; the males have a very quick and restless flight, are fond of flowers, but settle only for a very brief period; never observed on roads. The larva feeds on different species of *Citrus*, the larva and pupa being practically identical with those of *P. helenus*, so that it is only when the imago emerges that one is able to know with certainty which species is being bred. The pupal state lasts about a fortnight. Rothschild records it from Sumatra as (*b*), *P. nephelus saturnus*, Guérin, (a^2), ♀-ab. *albolineatus*, Forbes.

584. PAPILIO (*Charus*) DIOPHANTUS, Grose Smith.

P. diophantus, Grose Smith and Kirby, Rhop. Ex., vol. i, pl. *Papilio* i, figs. 4, *male*; 3, *female* (1887).

Grose Smith. Hagen as *diaphantus* [sic].

HABITAT: N.-E. Sumatra.

EXPANSE: ♀, 4·7 inches.

DESCRIPTION: FEMALE. Differs from the male in being larger. UPPERSIDE, *both wings* paler. *Forewing* with a diffused discal macular pale ochreous band from the inner margin to the lower discoidal nervule. *Hindwing* with the large quadrifid whitish patch of a deeper and more ochreous colour than in the male, and continued to the abdominal margin in a narrow decreasing deep ochreous band. UNDERSIDE, *both wings* as in the male.

Restricted to Sumatra, and found, like *P. forbesi*, Grose Smith, only on the Central Plateau not below 3,000 feet. The males on sandy river beds throughout the year. The female is very rare, Dr. Martin obtained two or three only in thirteen years. Messrs. Grose Smith and Kirby say that their fig. 3 is taken from a female. If this is so (it looks like a male) it differs greatly from the female described above by me.

585. PAPILIO (*Iliades*) MEMNON, Linnæus.

Grose Smith. Snellen. Hagen as *memnon* and *esperi*. Wallace. Staudinger. Kirby. In Sumatra the female of this species is represented by four distinct forms:—

I. Tailless, nearest to the male; forewing with a red epaulette, *i.e.*, the base of the discoidal cell on the upperside is red; the disc of the forewing beyond the discoidal cell towards the apex is whitish, there are all gradations from a few whitish streaks only between the veins to a large apical white area bearing a few black streaks and crossed by the black veins, the extreme apex of the wing is always dusky. Abdomen quite black, with the exception of the extreme apex which is yellow. This form from Sumatra is figured by Wallace in Trans. Linn. Soc. Lond., Zoology, first series, vol. xxv, pl. i, fig. 3 (1865).

II. Tailless; forewing with a creamy-white epaulette; the disc of the forewing beyond the discoidal cell towards the apex not whitish, but nearly as dark as in the male, but of a somewhat duller shade. Hindwing has the abdominal margin on the upperside yellow. The posterior moiety of the abdomen rich chrome-yellow.

III. Tailless; forewing with a red epaulette; the disc of the forewing beyond the discoidal cell towards the apex whitish as in Form I. Hindwing on the upperside with a large outer discal white area, bearing a series of seven submarginal rounded black spots, of which the four posterior ones are somewhat cuneiform in shape, and are surrounded by the white area, the abdominal margin yellow as in Form II. Abdomen as in Form II.

IV. Tailed; the tails shew much variety, being sometimes spatulate, sometimes simple and straight without any apical swelling; forewing with a red epaulette. Hindwing on the upperside with a large discal white area consisting of eight spots, and filling the discoidal cell all except the base; the abdominal margin being yellow. Abdomen entirely yellow except for a dorsal median black streak.

Forms I and II are common, III is rather rare, IV is very rare, Dr. Martin obtaining seven specimens only. Dr. Martin has frequently bred it, and has obtained all four forms of the female from eggs laid by one mother. Four eggs deposited by a tailed female (Form IV), did not yield a single tailed descendant like herself. The larva is green with some whitish lateral streaks and bluish markings. The pupa is suspended on the leaves or stalks of its food-plant, *Citrus limonellus*, Hassk., and *Citrus decumana*, Linnæus, it is green with the upperside yellow: if suspended on wood it is greyish-brown of the same shade as the wood. On one occasion a larva suspended itself on a common blue, white, and red tin of Huntley and Palmer's biscuits, and this pupa was very bright, and exhibited some blue and red tints. After 14–15 days the imago emerges, on one occasion during a most unusual spell of dry weather, one specimen remained 43 days in the pupa stage. This example was a very fine and large tailed Form IV female, but all the other tailed females bred by Dr. Martin emerged as usual in about a fortnight. *P. memnon* is common throughout the year in the plains, not higher than Bekantschan, in gardens and orchards, near houses and villages everywhere where species of *Citrus* grow. It is most plentiful in March. The male has a quick, restless, undulating flight, it frequents flowers, but never goes to wet spots on roads, and is mostly busy in search of the female through the orange and lime thickets round the Malay villages. The female has a slower, more sailing flight, and is often to be seen on lime trees depositing her round green eggs one at a time on young shoots. The full-fed larva from Java has been figured by

Heer M. C. Piepers in Tijd. voor Ent., vol. xxxi, p. 350, pl. viii, fig. 5 (1888).

586. Papilio (*Iliades*) forbesi, Grose Smith.

P. forbesi, Grose Smith and Kirby, Rhop. Ex., vol. i, pl. *Papilio* i, figs. 1, 2, *male* (1887); id., Martin, Nat. Tijd. voor Neder.-Indië, vol. liii, p. 335, n. 2 (1893).

Grose Smith. Hagen. The male is somewhat variable, on the upperside of the hindwing in some specimens the usual four anal grey lunules are almost obliterated. There are two forms of female:—

I. Forewing almost as in the male, somewhat paler only except the inner margin broadly towards the base. Hindwing with the anal half not quite touching the discoidal cell creamy-white, this area ending anteriorly at the second subcostal nervule; bearing in the submedian interspace an oval black spot which inwardly touches the narrow black abdominal margin, two conical equal-sized spots in the median interspaces, a conical but smaller spot than the two which precede it in the discoidal interspace; the margin bears five large black spots, of which those in the median interspaces alone are free. Underside, forewing somewhat paler than in the male. Hindwing has the basal red streaks as in the male, the large creamy-white area spotted with black as on its own upperside, but in the upper subcostal interspace there is an additional oval small whitish spot crowned with a few turquoise-blue scales, with some similar scales in the interspace above.

II. Similar to Form I, but the forewing has a creamy-white epaulette as in the Form II of the female of *P. memnon*, Linnæus, in Sumatra. It is possible that this form of *P. memnon* may mimic Form II of *P. forbesi*.

P. forbesi is found on the Central Plateau only, at a not less elevation than 3,000 feet above the sea, and flies all through the year. The male is common, and is caught on the sandy banks of hill streams; the female of both forms is excessively rare, Dr. Martin obtaining five specimens only. The first male was obtained by Mr. H. O. Forbes near Lake Ranau in Benkoelen quite in the south of Sumatra, the females described in 1893 by Dr. Martin were obtained in the previous year.

587. Papilio (*Laertias*) polytes, Linnæus.

Snellen as *pammon* and *polytes*. Grose Smith as *pammon* and *polytes*. Hagen. Wallace as *theseus*. Kirby as *numa*, Weber, and *antiphus*, De Haan (*nec* Fabricius). Distant. Dr. Wallace separates off the Sumatra, Java, Borneo, Celebes, Lombock, and Timor form from the India, Ceylon, China, and Malay Peninsula form, true *P. polytes*, under the name of *P. theseus*, Cramer, which differs in the male being

"Smaller, and the tail always reduced to a projecting tooth." Neither of these characters is constant, in specimens from N.-E. Sumatra the length of the tail especially is very variable, and it is often quite as long as in Indian specimens. In Sumatra *P. polytes* has two forms only of female:—

I. Very similar to the male.

II. Mimicking *P. antiphus*, Fabricius. This is the *P. theseus* of Cramer, Pap. Ex., vol. ii, pl. clxxx, fig. B (1777), described from the west coast of Sumatra; it is also figured by Wallace in Trans. Linn. Soc. Lond., first series, vol. xxv, p. 52, n. 63, pl. ii, fig. 7 (1865), from Sumatra. This form has practically no white spots on the disc of the hindwing as in the corresponding second form of the female of the Indian *P. polytes*, which there mimics *P. aristolochiæ*, Fabricius, a butterfly which in Sumatra is replaced by *P. antiphus*, though very rarely there is just a trace of a whitish spot in the discoidal cell. *Papilio numa*, Weber, was described from Sumatra, from the description it would appear to be the ordinary second form of the female of *P. polytes* found in India, so Weber's habitat is almost certainly incorrect. *P. polytes* is the most common *Papilio* of our area, and occurs probably everywhere except at the higher elevations and on the Central Plateau. It flies in gardens, orchards, on roads, near rivers, houses, and villages, and is always to be seen in the neighbourhood of lime trees. The females prefer to lay their eggs on young and low trees of species of *Citrus*, and deposit three or four eggs only on each bush. The young larvæ, like those of *P. memnon*, Linnæus, *P. helenus*, Linnæus, and *P. nephelus*, Boisduval, have a strong superficial likeness to a bird's dropping, which doubtless at this stage greatly protects them. The pupal stage is eleven days only. Heer M. C. Piepers has bred it in Java, and has figured three stages of the larva in Tijd. voor Ent., vol. xxxi, p. 352, pl. viii, figs. 6, 7, 8 (1888). Rothschild records it from Deli, Sumatra, as *P. polytes*, Linnæus, typical form; also as *P. polytes theseus*, Cramer, (g^1), ♀-f. *javanus*, Felder, from Sumatra, rare; also as *P. polytes theseus*, Cramer, (i^1), ♀-f. loc. *theseus*, Cramer, common.

588. PAPILIO (*Menamopsis*) PERSES, de Nicéville.

P. (*Menamopsis*) *perses*, de Nicéville, Journ. A. S. B., vol. lxiii, pt. 2, p. 46, n. 40, pl. iv, fig. 7, *male* (1894).

P. hewitsonii, Westwood, var. *sumatrana*, Hagen, Iris, vol. vii, p. 20, n. 11, (1894).

Hagen as *hewitsonii*, var. *sumatrana*. Also very rare, six specimens only in thirteen years, on high elevations not below 3,000 feet on the Central Plateau of the Karo Battaks and in the Gayoe territory in

November and January. The Hon. Walter Rothschild in Novitates Zoologicæ, vol. ii, p. 362 (1895), records this species as *P. slateri perses*, de Nicéville, from North-Eastern Sumatra. Neither Dr. Martin or I can agree with him in sinking *P. hewitsoni*, Westwood, from Borneo, and *P. perses* as sub-species of *P. slateri*, Hewitson, from N.-E. India, and *P. tavoyanus*, Butler, from Burma. The two latter have extensive blue markings on the upperside of the forewing, which the two former entirely lack, and no intergrades between them have been found, so we think that *P. hewitsoni* should stand as a full species, with *P. perses* as a local race.

589. PAPILIO (*Menamopsis*) PETRA, de Nicéville.

P. (*Menamopsis*) *petra*, de Nicéville, Journ. A. S. B., vol. lxiii, pt. 2, p. 47, n. 41, pl. iv, fig. 5, *male* (1894).

Described from a single example from the Gayoe mountains taken in January, 1893. No specimens have been obtained since. Rothschild records this species as (c), *P. slateri perses*, de Nicéville, (a^2), ab. *petra*, de Nicéville. He may be correct in assigning it to the position of an aberration only, but as the type is unique, it may be kept distinct for the present till further specimens are obtained and we know more about it. Mr. Rothschild's note is as follows:—"This insect has been discovered in the same district where *P. perses*, de Nicéville, was obtained, and it is most probably nothing but an atavistic example of the latter, provided it has the same structural characters as *P. slateri*, Hewitson. I have not had the opportunity to examine a specimen of this aberration." (Nov. Zool., vol. ii, p. 363 (1895).

590. PAPILIO (*Euplœopsis*) BUTLERI, Janson.

Grose Smith as *paradoxa*. Wallace as *paradoxa*, local form *b*. Hagen as *paradoxa*, var. *zanoa*. Dr. Wallace describes this species from Sumatra without naming it as follows:—"Smaller than *P. paradoxa*, Zinken-Sommer, from Java and Borneo; intermediate in the markings between the Java and Borneo forms; interior row of elongate marks on the upperside of the forewing light blue, not descending to the outer angle." Mr. Butler has described and figured three species of the *paradoxa* group from Sarawak in Borneo, viz., *P. zanoa*, *P. kerosa*, and *P. juda*. Without having the actual types to compare with Sumatran specimens, it is difficult to say if any of these supposed distinct species are the same as *P. butleri*; they are all obviously very nearly allied to that species and to one another. *P. butleri* was described from Malacca, and is recorded by Distant from Province

Wellesley and Kwala Lumpor in Selangor also in the Malay Peninsula. I possess two specimens from Quang and Kwala Lumpor. Sumatran specimens agree fairly well with Malay Peninsula ones, and with Distant's figure of the species, pl. xxvii*a*, fig. 6, *male*. Both sexes mimic the corresponding sexes of *Euplœa linnæi*, Moore. Dr. Martin has obtained two females only of *P. butleri*, which mimic the female of *E. linnæi*. It is rare in the plains and outer hills, near Selesseh, in Padang Bedagei and Asahan, also in the Gayoe territory, but certainly not much higher than Bekantschan, and flies from January to June and again in September, but in no other months. The males if undisturbed are on the wing exactly like *E. linnæi*, but as soon as they scent danger they assume the typical rapid flight of a *Papilio*. They are very fond of wet swampy spots on roads in the forest. The females are very scarce. Dr. Martin's brother bred it in Asahan in 1891 from larvæ found on a low shrub (not a creeper) in the forest; they were velvety black with fleshy red tubercles. The pupa, suspended by a black median girth, adheres by the three posterior abdominal segments to a branch of the food-plant, and looks like an obliquely cut off bit of stick as do the pupæ of all this group. The pupa is quite rigid, and has no motion in the abdominal segments whatever.

591. Papilio (*Euplœopsis*) ænigma, Wallace.

P. ænigma, Wallace, Trans. Linn. Soc. Lond., Zoology, first series, vol. xxv, p. 60, n. 83, pl. vii. fig. 3, *male* (1865).

Described by Wallace from Malacca, Sumatra, and Borneo. The specimen figured is from Sumatra. It is possible that the butterfly figured by Distant in Rhop. Malay., pl. xxvii, fig. 6, as the female of *P. butleri*, Janson, is the true female of *P. ænigma*. (Wallace records that species from Malacca as noted above, but Distant concludes that the Malaccan specimen so identified is the *P. butleri* described subsequently as a distinct species.) It is extremely difficult to say who is right, Wallace or Distant; the butterflies of this group are excessively rare, so that it is almost impossible to get together sufficient material to decide the point. Dr. Martin has two females only, one taken on the outer hills south of Namoe Oekor, in December, the other in Indragiri in the middle of Sumatra, in February. These specimens agree with Distant's figure above quoted, and I prefer to consider them to represent *P. ænigma* rather than to be a dimorphic form in the female of *P. butleri*. Dr. Martin, as noted above, possesses the ordinary form of the female of *P. butleri* which mimics the female of *Euplœa linnæi*, Moore, and was unknown to Distant.

592. PAPILIO (*Euplœopsis*) PENOMIMUS, Martin.

P. penomimus, Martin. Einige neue Tagschmetterlinge von Nordost-Sumatra (Munich), pt. 1, p. 2, n. 2 (1895).

This butterfly, though it has the *facies* of the species included in the *dissimilis* group (subgenus *Chilasa*), may belong to the *paradoxa* group (subgenus *Euplœopsis*), as it has the hindwing at the termination of the upper subcostal nervule produced, that being a characteristic feature of the species of the latter group. *P. penomimus* reminds one somewhat of *P. ramaceus*, Westwood, Trans. Ent. Soc. Lond., 1872, p. 95, pl. v, fig. 3, from Borneo, which species, however, is placed by Rothschild under *P. leucothoë*, Westwood. It is very rare in the forests of the plains and on the outer hills, occurs near Selesseh, at Bekantschan, and at Bandar Quala in Serdang from January to March and again in June. Dr. Martin bred it from some larvæ found by Herr O. Puttfarcken at Bandar Quala in Serdang in May, 1894. They feed on a low shrub in the forest called by the Malays "Daboen Laksah," are velvety green and deep indigo blue, with round lateral red spots, and short fleshy tubercles. The pupa is similar to that of *P. butleri*, Janson, being suspended by a black girth to a stalk of the food-plant, the three posterior abdominal segments greatly flattened on the side touching the stick. As the stalk was still green, the pupa also was mostly green with brown and white markings. The imago emerged in 16 days.

From what I can gather from Mr. Rothschild's paper on *Papilios*, the three last named species all belong to *P. paradoxus*, Zinken-Sommer, sub-species *telesicles*, Felder. Mr. Rothschild's collection appears to contain only three males and one female of the group from Sumatra, of which he enumerates the female as *P. paradoxus telesicles*, Felder, (r^2), ♀-ab. *daja*, Rothschild. He does not say what his males are. When he wrote his paper Dr. Martin's description of both sexes of *P. penomimus* had not reached him. Dr. Martin writes to me that after examining Dr. Staudinger's collection at Dresden, he considers that the three species we have enumerated above are all one, and that in Sumatra it is trimorphic in the female. What he has described as the male of *P. penomimus* is an error, all his specimens of that species being females. Rothschild names Distant's figure in Rhop. Malay., pl. xxviia, fig. 6, *male* " (n^2), ab. *distanti*"; and Distant's figure pl. xxvii, fig. 6, *female*, " (u^2), ab. *nepticula.*" As regards *P. ænigma*, Wallace, Rothschild records it as " (q^2), ♂-ab. *ænigma*, Wallace."

593. PAPILIO (*Euplœopsis*) ÆGIALUS, Distant.

P. velutinus, Butler, Ann. and Mag. of Nat. Hist., fifth series, vol. xvi, p. 343 (1885).

Grose Smith as *caunus.* Wallace as *caunus.* Butler as *velutinus.*

Originally described from the Malay Peninsula and is a local race of *P. caunus*, Westwood, of Java. It is one of a group which are amongst the most perfect mimics known, their models being the different local races of *Euplœa diocletianus*, Fabricius. It is very rare, Dr. Martin in thirteen years has obtained two specimens only, both males, in forest near Selesseh, the first on 23rd April, 1893, the second on 15th July, 1894. The first was captured by a very clever Chinese collector, who watched and followed the butterfly for nearly half the day before he was able to catch it. He correctly took it for a *Papilio*, but thought it might be a female of *P. butleri*, Janson. Rothschild records this species from Sumatra as *P. caunus ægialus*, Distant, and notes that "The type-specimen of *P. ægialus*, Distant, now in my collection, does not differ from that of *P. velutinus*, Butler, in the British Museum, except in the submarginal markings of the hindwing, which are a little smaller in *P. velutinus*; one of my three *P. ægialus* from the Malay Peninsula has these spots, however, not larger than the type of *P. velutinus*."

594. PAPILIO (*Achillides*) ARJUNA, Horsfield.

P. arjuna, Horsfield, var. *gedeensis*, Fruhstorfer, Ent. Nach., vol. xix, p. 287 (1893); idem, id., Stet. Ent. Zeit., vol. lv, p. 118 (1894).

Wallace. Hagen. Staudinger. Herr H. Fruhstorfer has recently described not only *P. gedeensis* from W. Java and Sumatra, but also *P. prillwitzi* from W. Java, and *P. tenggerensis* from E. Java, while admitting the occurrence of *P. arjuna* also in Java. I have not sufficient material to form an opinion as to whether or not all these four species (five including *P. karna*, Felder), all closely allied, and from one island, are distinct and valid. Herr Fruhstorfer has sent me specimens of *P. gedeensis* from Java which agree with my Sumatran examples of *P. arjuna*. They differ from Horsfield's figure of the latter in lacking a pale green band across the disc of the forewing on the upperside. In Sumatra specimens are found with and without the green band; the latter are the commoner. Further observations appear to be necessary before Herr Fruhstorfer's species can be accepted. *P. arjuna* in Sumatra is restricted to the Central Plateau, where it is common and flies throughout the year, as the collectors brought in specimens in every month. Is not nearly so shy or quick on the wing as *P. palinurus*, Fabricius. Rothschild places *P. tenggerensis* as a pure synonym of *P. arjuna*; he gives *P. gedeensis* as *P. arjuna*, Horsfield, (a^1), ab. *gedeensis*, Fruhstorfer; and allows *P. prillwitzi* full specific rank.

595. Papilio (*Achillides*) karna, Felder.

P. (*Achillides*) *discordia*, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. vii, p. 343, n. 17, pl. I, fig. 2, *male* (1892).

Hagen as *karna*. When describing this distinct species I overlooked *P. karna*, Felder, described from Java, as Mr. Kirby had placed it in his Synonomic Catalogue as a "var." of *P. arjuna*, Horsfield, instead of admitting its undoubtedly valid specific rank as he should have done. It is very rare, and occurs on the western boundary of our area in the Gayoe territory, from whence in thirteen years Dr. Martin obtained only ten specimens in the months of January and May. This fine species is much larger than *P. arjuna*. Mr. Rothschild considers *P. karna* to be a sub-species only of *P. arjuna*, and records it from Sumatra as (*b*), *P. arjuna karna*, Felder.

596. Papilio (*Harimala*) palinurus, Fabricius.

Grose Smith as *palinurus* and *brama*. Hagen as *palinurus* and *brama*. Wallace as *brama*. Butler as *brama*. Distant as *brama*. Kirby as *palinurus*, De Haan (*nec* Fabricius). No author as far as I am aware has ventured to point out how *P. palinurus*, Fabricius, and *P. dædalus*, Felder, are supposed to differ. Dr. Wallace in his paper on the *Papilionidæ* of the Malayan Region keeps *P. brama*, Guérin, described from the Malayan Coast, and *P. dædalus* distinct, but does not mention *P. palinurus* at all. The latter was described by Fabricius from Tranquebar. *P. palinurus* is found in Burma, the Malay Peninsula, Sumatra, Borneo, and the Philippine Isles, *P. dædalus* in the Philippines. A closely allied species is *P. crino*, Fabricius, erroneously described from Africa, but found from Northern India to Ceylon. I have a good series of *P. palinurus* from all the localities above named, and can find no single character by which to separate them. The exact position of the discal green band on the upperside of the hindwing seems to be inconstant, in some specimens it reaches well into the discoidal cell, in others it is bounded by the disco-cellular nervules. In Sumatra *P. palinurus* is found in the plains only of Deli and Langkat, occurring throughout the year, and is decidedly rare, but is somewhat commoner in Serdang. It flies in the forest and settles on wet spots on forest roads. It is fond of flowers, *Ixora*, *Lantana*, &c., goes to gardens, and is very shy and quick on the wing. It is not protected against birds, as Dr. Martin has often picked up wings without body.

597. Papilio (*Meandrusa*) payeni, Boisduval.

Grose Smith. Hagen. *P. evan*, Doubleday, from N.-E. India, is a local race of *P. payeni*, Boisduval, from which it differs chiefly in being larger. *P. payeni* was originally described from Java. Rare at high elevations, not below 2,000 feet in the Battak and Gayoe mountains in March and September. Only five specimens obtained in thirteen years. Rothschild records it from Sumatra and Borneo as (*b*), *P. payeni brunei*, Fruhstorfer, Ent. Nach., vol. xx, p. 300 (1894), originally described from Brunei, North Borneo.

598. PAPILIO (*Pathysa*) ANTIPHATES, Cramer.

P. ***itam-puti*****, Butler, Nat. Wand. in East. Arch., p. 276 (1885).**

Snellen. Hagen as *antiphates*; and *antiphates*, var. *pompilius*. Wallace as *antiphates*, local form *a*, *Podalirius pompilius*, Swainson. Distant as *antiphates*, var. *pompilius*. This is a very variable species wherever it occurs, and as the variations found do not appear to be restricted to geographical areas, it does not seem possible to break up the parent species described from China into local races. It is common over the whole of our area, in and near forest, and throughout the year, but most abundant in March. The males come in crowds to wet spots on roads, and settle among a number of *Pierinæ*, where they evidently feel protected as they also have white wings; when on the wing they look like a "White," as their long tails when flying rapidly can hardly be seen. The females are only caught in the forest as they do not come to roads. Heer M. C. Piepers has bred it in Java, and has figured the larva in Tijd. voor Ent., vol. xxxi, p. 349, pl. viii, fig. 4 (1888). Rothschild records the typical race of *P. antiphates* from Eastern China; the Sumatran form as a subspecies, (*b*), *P. antiphates alcibiades*, Fabricius; with an aberration which "Seems to be the usual form in Sumatra, but occurs also in other localities," as (c^2), ab. *itamputi*, Butler.

599. PAPILIO (*Pathysa*) INSULARIS, Staudinger.

P. ***agetes*****, Westwood, var.** ***insularis*****, Staudinger, Iris, vol. vii, p. 349 (1895).**

Hagen as *agetes*. Staudinger as *agetes*, var. *insularis*. This species was described from Sumatra interior, and the Kina Balu mountain in Borneo. I allow it specific rank with some misgivings. The Himalayan, Assamese, and Burmese forms (true *P. agetes*) have the second band from the base of the forewing ending at the submedian nervure, in the Malayan Peninsula form it ends in the middle of the submedian interspace (*vide* Distant's figure in Rhop. Malay., pl. xlii, fig. 8), in Sumatran specimens the band is the shortest of all, and ends on the median nervure. All the markings in the Malay Peninsula and Sumatra specimens are darker than in the typical Indian form. But all three forms evidently grade almost imperceptibly the one into the other.

Found only at high elevations, not below 3,000 feet, on the Central Plateau and in the Gayoe mountains, throughout the year, but most abundant in December and January, in which months the Battak collectors brought in hundreds of males. This butterfly, like species of *Charaxes*, very easily rots, as all specimens brought from the mountains if not properly dried at once in the sun or by the fire fall to pieces. Rothschild records this species from Sumatra as (*b*), *P. agetes insularis*, Staudinger.

600. PAPILIO (*Pathysa*) HERMOCRATES, Felder.

Hagen as *anticrates*, var. Flies only in the forests of the plains, where it is very rare. A few specimens only obtained at Paya Bakong near the sea in April, and one from near Selesseh in June. Dr. Hagen had only one specimen from the Gayoe-lands. Rothschild records it from Sumatra as (*d*), *P. aristeus hermocrates*, Felder.

601. PAPILIO (*Zetides*) EMPEDOCLES, Fabricius.

Hagen. This species appears to be migrating westwards, Dr. Wallace in 1865 recorded it from Borneo, it has within the last five years appeared in Sumatra, and in Malacca, Penang and Perak in the Malay Peninsula. In Sumatra only three specimens have been taken in June and December at a high elevation in the mountains. Rothschild records it from Java, Banka Island and Palawan.

602. PAPILIO (*Zetides*) EURYPYLUS, Linnæus.

Wallace as *jason*. Grose Smith as *eurypilus* [sic]. Snellen as *jason*. Hagen as *eurypylus* and *telephus*. Dr. Wallace in Trans. Linn. Soc. Lond., Zoology, first series, vol. xxv, pl. viii, fig. 4 (1865), has figured the outline of the costa of the forewing of this species from Sumatra. Heer M. C. Piepers has bred it in Java, and beautifully figured three stages of the larva under the name of *P. jason*, Esper, in Tijd. voor Ent., vol. xxxi, p. 347, pl. viii, figs. 1, 2, 3 (1888). Rothschild records this species from Sumatra as (*h*), *P. eurypylus axion*, Felder.

603. PAPILIO (*Zetides*) MECISTEUS, Distant.

Hagen. Rothschild does not allow *P. mecisteus* specific rank; he records it as (*h*), *P. eurypylus axion*, Felder, (b^3), ab. *mecisteus*, Distant.

604. PAPILIO (*Zetides*) EVEMON, Boisduval.

Wallace as *P. jason*, Esper, variety or dimorphic form *a*. Distant. Hagen. Dr. Wallace writes of this species:—"This may be a distinct species, but is more probably a case of dimorphism. The two forms

[*P. jason* and *P. evemon*] are absolutely identical, except that the red spot at the base of the hindwing on the underside, in *P. jason*, Esper, is constantly absent in *P. evemon*, Boisduval." Rothschild gives *P. evemon* full specific rank.

605. Papilio (*Zetides*) bathycles, Zinken-Sommer.

Grose Smith. Hagen. Rothschild records the typical form from Java, and "Most probably also in South-West Sumatra," and the ordinary Sumatran form as (*b*), *P. bathycles bathycloides*, Honrath. These four last mentioned species are all inhabitants of the plains, where they occur throughout the year in and near forest, the males often settled in dozens on wet spots on roads. They are all quick and strong on the wing, but not quite as fast-flying as *P. sarpedon*, Linnæus. If chased away from their favourite spots they behave very like species of *Catopsilia*, and hurry up and down the forest roads in Indian file. *P. mecisteus*, Distant, and *P. bathycles* are somewhat the rarer, the latter is also found at higher elevations than the others, to the south of Bekantschan.

606. Papilio (*Dalchina*) sarpedon, Linnæus.

Snellen. Hagen. Grose Smith. Wallace. Distant. Common all over our area, from the plains to a high elevation throughout the year on forest roads. The males sit often six or eight together on a wet spot on the road. It has a very strong, quick, and jerking flight. I have figured and described a highly melanic aberration of this species from Sumatra in Journ. Bomb. Nat. Hist. Soc., vol. viii, p. 54, n. 14, pl. L, fig. 11, *male* (1893). Heer M. C. Piepers has bred it in Java, and has figured the two final stages of the larva in Tijd. voor Ent., vol. xxxi, p. 346, pl. vii, figs. 8, 9 (1888). Rothschild records the typical form of the species from Sumatra.

607. Papilio (*Dalchina*) cloanthus, Westwood.

Snellen. Hagen as *cloanthus*, var. *sumatrana*, Hagen. Rothschild records it from Sumatra as (*c*), *P. cloanthus sumatranus*, Hagen. The Sumatran form is slightly more melanic than the typical form from North India and Assam, that is to say, the black areas in the forewing are somewhat larger, thereby reducing the bluish-green markings somewhat. It is almost doubtful if Sumatran specimens could be correctly sorted out from Indian ones if the labels from both were removed and the specimens mixed up. The Western and Central Chinese form, *P. cloanthus*, var. *clymenus*, Leech, is a good local race, and can be distinguished at a glance. In Sumatra *P. cloanthus* is found on the Central

Plateau, not below 3,000 feet, where it occurs not very rarely throughout the year.

608. *PAPILIO (*Zetides*) ARYCLES, Boisduval.

Wallace as *rama*. Butler. As this species occurs in the Malay Peninsula and in Borneo, I have no doubt that Messrs. Wallace and Butler have correctly recorded it from Sumatra, though we have not met with it. The *P. rama* of Felder, is a synonym of *P. arycles*. Since the above was in type I find that Rothschild has four males from Palembang in the south of Sumatra.

609. PAPILIO (*Zetides*) AGAMEMNON, Linnæus.

Grose Smith. Snellen. Hagen. Wallace. Distant. Dr. Wallace records this species from Malacca, Sumatra, Borneo, and Java as local form *c*. "Size small; tail very short." The typical form of *P. agamemnon* he gives from India, and Manilla in the Philippine Isles. He has figured the outline of the costa of the forewing of this species from Sumatra in Trans. Linn. Soc. Lond., Zoology, first series, vol. xxv, pl. viii, fig. 6 (1865). Rothschild records the typical form from Sumatra. Heer M. C. Piepers has bred it in Java, and has figured all stages of the larva in Tijd. voor Ent., vol. xxxi, p. 341, pl. vii, figs. 1–7 (1888). It is common throughout the year everywhere in the plains where *Anona muricata* and *Michelia champaca*, Linnæus, the food-plants of the larvæ, are found, and frequents the flowers of the *Lantana*, &c., in gardens and near houses. As the butterfly is found also often in the forest, some wild species of *Anonaceæ* or an allied plant for the larva to feed on must grow there. The full-fed larva exists in two varieties, a bright transparent shining green form, and a yellow form, both having on the first three segments (omitting the head) a horny tubercle with orange base one on each side of each segment. The pupa, which bears a nose-like projection from the thorax directed forwards over the head, is green with some brownish markings, and is suspended by a white girdle. After 15 days the imago emerges from the pupa. The female butterfly prefers young low plants of the *Anona* on which to lay her eggs, as on young newly planted bushes four or five caterpillars are often found together. A "variety" of *P. agamemnon* from Western Java has been described and figured by Heer P. C. T. Snellen in Tijd. voor Ent., vol xxxvii, p. 71, n. 3, pl. iii, fig. 3, *female* (1890). It has all the usual macular green markings of the upperside of a deep ochreous colour, probably due to chemical action, possibly that of cyanide of potassium.

610. PAPILIO (*Paranticopsis*) XANTHOSOMA, Staudinger.

P. maccareus [sic], Godart, var. *xanthosoma*, Staudinger, Iris, vol. ii, p. 7 (1889).

Hagen as *macareus*, Godardt [sic]; and *macareus*, var. *xanthosoma*. Staudinger as *macareus*; and *maccareus* [sic], var. *xanthosoma*. Occurs throughout the year in the plains (Selesseh and Paya Bakong), on the outer hills, and as far south as Soengei Batoe, also in the Gayoe territory; most abundant in November, March and April. In November, 1894, two Malay collectors brought in 104 male specimens collected in six days from Kepras near Bohorok. We have never seen a female. The male may be a mimic of *Danais vulgaris*, Butler, or, as it has a deep yellow abdomen, of *Danais banksii*, Moore. They fly exactly like a *Danais*, but betray themselves to the collector by coming to wet spots on roads, which *Danais* seldom do; also when settled they keep their wings in constant motion, whereas a *Danais* always rests with folded motionless wings. Rothschild records this species from Sumatra as (*c*), *P. macareus xanthosoma*, Staudinger.

611. PAPILIO (*Paranticopsis*) LEUCOTHOE, Westwood.

P. *leucothoë*, Westwood, var. *interjectus*, Honrath, Berl. Ent. Zeitsch., vol. xxxvii, p. 490 (1893).

Hagen as *leucothoë*; and *leucothoë*, var. *interjectus*. Distant. Staudinger. A variable species as regards the extent of the white markings in all the localities where it is found. Occurs in the forests of the plains (Selesseh), and outer hills (Namoe Oekor), not much higher than Bekantschan; also in Asahan and Indragiri. Rather rare in February and March, and again in September. Its habits on the wing are similar to those of *P. butleri*, Janson. It is doubtless a good mimic of a brown *Euplœa*. Rothschild records it from Sumatra as (*b*), *P. leucothoë interjectus*, Honrath.

612. PAPILIO (*Paranticopsis*) DELESSERTII, Guérin.

Grose Smith. Hagen as *laodocus*. The *P. delessertii* of Guérin described originally from Pulo-Pinang, has priority over *P. laodocus*, De Haan, by one year. The butterfly is a beautiful mimic of *Ideopsis daos*, Boisduval. The female is paler than the male, from which it may instantly be known by the two spots beyond the discoidal cell bisected by the lower discoidal and third median nervules in the forewing being fused into a large quadrate patch. Found throughout the year in the plains and outer hills, most abundant from February to April, Dr. Martin took it himself near Paya Bakong not far from the sea. Very common on the western boundary of our area at Bohorok and in the Gayoe territory. The males come to roads and to sandy river banks; the females are very rare, and Dr. Martin obtained three only.

613. PAPILIO (*Paranticopsis*) MEGARUS, Westwood.

Hagen. Very rare in our area, perhaps less scarce on the western boundary, four specimens only obtained from January to March at Kepras and Bohorok. Dr. Hagen obtained a single example from the outer hills.

614. LEPTOCIRCUS CURIUS, Fabricius.

Grose Smith. Snellen. Hagen. Staudinger. Distant.

615. LEPTOCIRCUS MEGES, Zinken-Sommer.

Hagen. Staudinger as *virescens*. Both species of *Leptocircus* occur throughout the year in the plains and on the outer hills; they are fond of running water, and fly very low over open grassy places on river banks; they often settle on wet sand, but never on the grass. When flying they make constantly a strange vibrating motion with the hind-wings, which adds to their strong likeness to dragonflies. The females are rare.

Family HESPERIIDÆ.

In the family *Hesperiidæ* we have followed the order given in Captain E Y. Watson's paper in the Journal of the Bombay Natural History Society, vol. ix, p. 411 (1895), entitled "A key to the Asiatic Genera of the *Hesperiidæ*," which considerably changes the sequence of the genera in Captain Watson's previous paper in the Proceedings of the Zoological Society of London, 1893, p. 3, "A proposed Classification of the *Hesperiidæ*, with a Revision of the Genera."

616. ORTHOPHŒTUS PHANÆUS, Hewitson.

Grose Smith as *phaneus* [sic]. Occurs rarely in forest near Selessen and on the outer hills, only two male specimens obtained, one in April, the other in August.

617. CHARMION FICULNEA, Hewitson.

C. ficulnea, de Nicéville, Journ. A. S. B., vol. lxiii, pt. 2, p. 49, n. 1 (1894).

Grose Smith. On the outer hills and near Bekantschan throughout the year not very commonly.

618. *CELÆNORRHINUS LADANA, Butler.

Astictopterus ladana, Elwes, Proc. Zool. Soc. Lond., 1892, p. 662, pl. xliii, fig. 4, *male.*

Grose Smith. I have never seen this species.

619. CELÆNORRHINUS LEUCOCERA, Kollar.

Throughout the year, but most plentifully in March, and fairly common from Bekantschan to the Central Plateau, never at lower elevations.

620. CELÆNORRHINUS SIMULA, Hewitson.

Pterygospidea simula, Hewitson, Ann. and Mag. of Nat. Hist., fourth series, vol. xx, p. 321 (1877).

Hewitson. Grose Smith. Originally described from Sumatra. Occurs at the same time, and in the same localities, as *C. leucocera*, Kollar, but is somewhat rarer.

621. CELÆNORRHINUS ASMARA, Butler.

Hagen as *acmara* [sic]. Very rare, only two specimens obtained from the mountains in October.

622. CELÆNORRHINUS AURIVITTATA, Moore.

Hagen. Common throughout the year from Selesseh to Bekantschan; very plentiful near Namoe Oekor. It is very quick flying, and always settles on the undersides of leaves near the ground.

623. COLADENIA DAN, Fabricius.

Snellen. Hagen. Staudinger. Common over the whole of our area, and flies throughout the year, often frequenting the same flowers as *Zemeros albipunctata*, Butler, and *Z. emesoides*, Felder, on which it settles in nearly the same manner, so that it is only when the insect is in the net that its identity can often be determined.

624. DAIMIO DIRÆ, de Nicéville.

D. diræ, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. x, p. , n. 37, pl. Q, fig. 49, *male* (1896).

Rare, five specimens only, from May to July near Selesseh and on the outer hills near Namoe Oekor.

625. SATARUPA GOPALA, Moore.

Only at higher elevations south of Bekantschan rarely throughout the year. It is an interesting fact that this butterfly, which has only hitherto been recorded from Sikhim, Assam, and Burma, should occur as far south as Sumatra.

626. SATARUPA AFFINIS, Druce.

The "*Tagiades*" *niphates*, Weymer, Stet. Ent. Zeit., vol. xlviii, p. 15, n. 13, pl. i, fig. 5, *male* (1887), from West Sumatra (Padang) is a synonym of this species. In Sumatra it occurs at the same elevations as *S. gopala*, Moore, but also lower down on the outer hills. It is a much commoner butterfly, and flies throughout the year.

627. *SATARUPA SAMBARA, Moore.

Hagen. This is probably an incorrect identification, the last-named species being intended. Herr G. Weymer notes (l. c.) that *Tagiades cosima*, Plötz, described from North India, is a synonym of this species.

628. ODINA HIEROGLYPHICA, Butler.

Excessively rare, only one specimen from Bekantschan in October, 1893.*

629. *TAGIADES JAPETUS, Cramer.

Snellen. Hagen. Originally described from Amboina. We have nothing from Sumatra agreeing exactly with Cramer's figure, which shews on the forewing the usual three subapical transparent white dots, two similar spots in the discoidal cell, and two on the disc divided by the second median nervule. It is very closely allied to the next species.

630. TAGIADES GANA, Moore.

Snellen. Hagen as *gaua* [sic]. Not rare in the plains.

631. TAGIADES ATTICUS, Fabricius.

Occurs commonly over the whole of our area.

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* I take this opportunity to describe a butterfly closely allied to *Odina hieroglyphica.*

ODINA ORTYGIA, de Nicéville, n. sp.

HABITAT: Daunat Range, Tenasserim, Burma.

EXPANSE: Male, 1·45 inches.

DESCRIPTION: MALE. Closely allied to "*Plastingia*" *hieroglyphica*, Butler, described from Sarawak (Borneo), differing therefrom on both surfaces in having all the black markings reduced by half, all the orange markings therefore greatly enlarged. It may be said (to judge from Mr. Butler's figure) that *O. hieroglyphica* is a black insect with yellow spots, while *O. ortygia* is a yellow insect with narrow black lines dividing the surface into irregular orange tessellations.

I hope to more fully describe and figure this very beautiful butterfly at a subsequent date. The type is unique in my collection.

632. TAGIADES TOBA, de Nicéville.

T. toba, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. x, p. , n. 32, pl. T, fig. 47, *male* (1896).

Occurs somewhat rarely in March, April and October in the mountains south of Namoe Oekor.

633. TAGIADES DEALBATA, Distant.

Found rarely in the mountains south of Namoe Oekor.

634. TAGIADES RAVI, Moore.

Hagen as *rani* [sic]. Butler. Not uncommon in the plains.

635. TAGIADES PRALAYA, Moore.

Not common in the mountains south of Namoe Oekor.

636. TAGIADES TRICHONEURA, Felder.

Grose Smith. Hagen. Occurs rarely in the same regions as the last-named species.

637. TAGIADES PINWILLI, Butler.

Originally described from Malacca. Excessively rare, a single specimen only obtained on the outer hills on 9th July, 1894. I have both sexes of this species from Toungoo in Central Burma. All the species of *Tagiades* are true inhabitants of high forest, and are very quick on the wing, but they never fly for long distances, and settle often with outspread wings, mostly on the underside of leaves. The species which have white markings on the wings when flying look wholly white.

638. TAPENA LAXMI, de Nicéville.

Originally described from Upper Tenasserim and Perak; occurs also at Singla, below Darjiling, in May. In Sumatra it is rare in the forests of the outer hills near Namoe Oekor. Dr. Martin possesses three pairs only, taken in February, May to August, and December.

639. TAPENA THWAITESI, Moore.

Originally described from Ceylon. Is not the "*Plesioneura*" *atilia*, Mabille, var. *palawana*, Staudinger, Iris, vol. ii, pp. 157, 165, pl. ii, fig. 11, *male* (1889), the same species as, or very closely allied to, *T. thwaitesi*? The description and figure are said to have been taken from a male specimen, but the markings are those of the female of *T. thwaitesi*. This species is very rare in Sumatra, only two specimens having been obtained in April in the forest near Selesseh.

Dr. Martin informs me by letter from Munich that he possesses three specimens of a third species of *Tapena* which may perhaps be *T. agni*, de Nicéville. As I have not seen these specimens I cannot include them in the list.

640. ODONTOPTILUM ANGULATA, Felder.

Hagen as *angulatus* [sic]. Staudinger. The *Achlyodes sura* of Moore, described from N.-E. Bengal, is a synonym.

641. ODONTOPTILUM PYGELA, Hewitson.

Both species of *Odontoptilum* are common, *O. angulata*, Felder, at lower, *O. pygela* at higher elevations, and occur throughout the year. They frequent wet spots on roads, settling with wide-spread wings. *O. angulata* is called by the Malay collectors "Koepoe Tai ayam, The fowl's excrement butterfly," which is a very good description of its appearance.

642. *ASTICTOPTERUS JAMA, Felder.

Grose Smith. Butler. Distant. I have never been able to identify this species which was originally described from a male from the Malay Peninsula.

643. ASTICTOPTERUS OLIVASCENS, Moore.

Isoteinon melania, Plötz, Berl. Ent. Zeitsch., vol. xxix, p. 230, n. 26 (1885); *Astictopterus melania*, id., Stet. Ent. Zeit., vol. xlvii, p. 110, n. 4 (1886).

Hagen as *olivescens* [sic], and *Isoteinia* [sic] *melania*. Herr G. Weymer has sent me a coloured drawing of the type of "*Isoteinon*" *melania* in the collection of Herr Karl Ribbe. It appears to be the same species as *Astictopterus olivascens*, Moore, which latter species is not mentioned by Plötz in any of his papers, and appears therefore to have been unknown to him. *I. melania* was described from Malacca. In Sumatra *A. olivascens* is very common and ubiquitous throughout the year, and with *Padraona dara*, Kollar, is the commonest of our *Hesperiidæ*. The males are very fond of the flowers of a wild Geranium-like plant and are found on every roadside and hedge. The dark uniformly coloured butterfly has a pretty appearance when contrasted with the tiny red cup of the flower on which it is resting.

644. SANCUS PULLIGO, Mabille.

Grose Smith as *fuscula*. Hagen as *fuscula*. According to Captain Watson, "*Tagiades*" *fuscula*, Snellen (="*Astictopterus*" *celunda*, Staudinger), is, as far as is known, confined to Celebes, while *S. pulligo*, Mabille (=*subfasciatus*, Moore, and *ulunda*, Plötz), occurs in South India, Burma, the Malay Peninsula, Java, Borneo, the Sulu Isles, and the Philippine Isles. In Sumatra it is common on the outer hills and plentiful near Namoe Oekor throughout the year.

645. KORUTHAIALOS XANITES, Butler.

Grose Smith. I sent a long suite of specimens of this genus allied to *K. xanites* to Captain Watson, who pronounces that amongst them are several undescribed species from Sumatra, to be discriminated by the length of the palpi and the greater or less prominence of the orange markings on both sides of the forewing. As this latter feature is apparently extremely variable I hesitate to describe any of these supposed new species, as before doing so I think that critical examination of the prehensores of the males of all the species of the genus should be made.

646. KORUTHAIALOS VERONES, Hewitson.

Astictopterus verones, Hewitson, Ann. and Mag. of Nat. Hist., fifth series, vol. i, p. 341 (1878).

Hewitson. Grose Smith. Originally described from Sumatra thus:—"Both sides rufous-brown. Underside of the anterior wing marked by a subapical rufous spot." This is one of the well-marked forms of the genus, which I possess also from Java. It occurs in Sumatra not uncommonly with *K. xanites*, Butler.

647. KORUTHAIALOS KERALA, de Nicéville.

K. kerala, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. x, p. , n. 33, pl. T, fig. 48, *male* (1896).

Somewhat rare, occurs in the mountains in May.

648. KORUTHAIALOS KOPHENE, de Nicéville.

K. kophene, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. x, p. , n. 34, pl. T, figs. 49, *male*; 50, *female* (1896).

A rarer species than the one last-named, we possess three or four specimens only from Sumatra. All the species of the genus are inhabitants of the forest, where they are chiefly found on grassy forest paths and on low flowers. They occur more abundantly at higher elevations south of Namoe Oekor.

649. SUADA SWERGA, de Nicéville.

S. swerga, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. ix, p. 372, n. 1 (1895).

This species has a wide range, occurring in Sikhim, Burma, the

Malay Peninsula and Java, as well as at Bekantschan in N.-E. Sumatra in November, rarely.

650. *SUASTUS GREMIUS, Fabricius.

Staudinger. A very common "Skipper" in India, Ceylon, and Burma, but we have not met with it in Sumatra.

651. SUASTUS TRIPURA, de Nicéville.

Tagiades tripura, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. vi, p. 392, n. 36, pl. G, fig. 39, *female* (1891).

Originally described from Perak; occurs also at Selesseh and in the outer hills of Langkat rarely in March and December, and in Java and Pulo Laut.

652. SUASTUS PHIDITIA, Hewitson.

Hewitson. Grose Smith. Kirby. Originally described from Sumatra, where it occurs rarely at Namoe Oekor.

653. IAMBRIX STELLIFER, Butler.

Grose Smith as *salsala*. Captain E. Y. Watson notes that "*I. stellifer* is quite distinct from *I. salsala*, Moore, with which it has been said to be synonymous. It is smaller and darker, and is entirely without the golden yellow scales on the upperside which are characteristic of *I. salsala*." It is a common species in the forests of the outer hills throughout the year. It has a very quick flight, and keeps close to the ground; being so small it is not easy to see when on the wing.

654. IAMBRIX SINDU, Felder.

Hagen. Grose Smith. Found in the same localities and at the same seasons as the last-named butterfly, but is rarer and not so quick on the wing.

655. GE GETA, de Nicéville.

G. geta, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. ix, p. 374, n. 3[illegible] fig. 51, *male* (1895).

Described from Penang in the Malay Peninsula, and fr[illegible].-E. Sumatra, where it is very rare, a few males only having been obtained from Selesseh and the outer hills in July.

656. AMPITTIA MARO, Fabricius.

Thymelicus palemonides, Snellen, Midden-Sumatra, Lep., p. 28, n. 1 (1892).

Snellen as *palemonides*. Rare and very local in our area, found at Stabat and near Bandar Quala in Serdang.

657. AEROMACHUS INDISTINCTA, Moore.

Occurs at high elevations from Bekantschan to the Central Plateau from May to August.

658. LOPHOIDES IAPIS, de Nicéville.

Isoteinon iapis, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. v, p. 213, n. 15, pl. E, fig. 9, *male* (1890).

Originally described from Burma and the Malay Peninsula, occurs also in Java and Pulo Laut. In Sumatra it is found somewhat rarely from Selesseh to Bekantschan from July to October.

659. HYAROTIS ADRASTUS, Cramer.

Hagen as *phœnicis*. Very rare in Sumatra though so common in India, but occurs throughout the year at Paya Bakong and near Bindjoi. In September, 1894, Dr. Martin noticed a plant of *Calamus* (rattan cane) in front of his house at Bindjei, the leaves of which were much eaten, and attached to the leaves were several empty and one full pupa of this species. The latter was affixed to a leaf closed with a web, and looked more like a living satyrine larva about to turn to a pupa than a real pupa of a hesperid. It was affixed quite flatly to the leaf, and was capable of considerable motion.

660. ITYS IADERA, de Nicéville.

I. iadera, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. ix, p. 379, n. 41, pl. Q. fig. 52, *male* (1895).

Described from Penang and the Battak mountains of N.-E. Sumatra, where it occurs throughout the year at high elevations south of Bekantschan.

661. ZOGRAPHETUS OGYGIA, Hewitson.

Hewitson. Grose Smith. Kirby. Originally described from Sumatra. Occurs throughout the year at Selesseh and Namoe Ookor in the forest, and has a very rapid flight. Fresh specimens have a beautiful bluish gloss on the upperside of both wings.

662. ISMA FERALIA, Hewitson.

Originally described from Java. Rare in the outer hills of Sumatra in September.

663. ISMA BONONIA, Hewitson.

In the outer hills in September, very rare.

664. ISMA INARIME, de Nicéville.

I. inarime, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. vi, p. 391, n. 35, pl. G, fig. 38, *male* (1891).

Originally described from Perak, found also in Pulo Laut. In Sumatra it occurs in the forest near Selesseh throughout the year, but is rare.

665. ISMA CORISSA, Hewitson.

Isoteinon indrasana, Elwes and de Nicéville, Journ. A. S. B., vol. lv, pt. 2, p. 441, n. 166, pl. xx, fig. 5, *female* (1887).

Originally described from Borneo, occurs also in Lower Burma and Tavoy. In Sumatra it is found in the mountains south of Namoe Oekor and Bekantschan in February, July, August, October, and December.

666. ISMA SUBMACULATA, Staudinger.

Plastingia submaculata, Staudinger, Iris, vol. ii, p. 149, pl. ii, fig. 8, *male* (1889).

Originally described from Palawan in the Philippine Isles. We possess specimens from Selesseh taken in October.

667. MATAPA ARIA, Moore.

Grose Smith. Hagen as *avia* [sic]. Occurs throughout the year in the plains somewhat plentifully. At Bindjei it entered Dr. Martin's house several times at 7 o'clock in the evening attracted by the just lighted lamps in the verandah.

668. MATAPA DRUNA, Moore.

From Bindjei to the outer hills in February and July; rarer than the last-named species.

669. MATAPA SASIVARNA, Moore.

Occurs in the plains and also at higher elevations, found at Bekantschan in July, August and December.

670. SEPA CRONUS, de Nicéville.

S. cronus, de Nicéville, Journ. A. S. B., vol. lxiii, pt. 2, p. 50, n. 42, pl. v, fig. 4, *male* (1894).

The type, which is still unique, was taken in the Battak mountains on 10th September, 1893.

671. ACERBAS ANTHEA, Hewitson.

A. anthea, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. ix, p. 382, n. 1 (1895).

Originally described from Singapore; occurs also in Tenasserim, Malacca, Java, and Borneo. In Sumatra a unique example was taken in the Battak mountains in August, 1894.

672. ZEA MYTHECA, Hewitson.

Originally described from Malacca. Dr. Martin obtained a single male example in the Battak mountains of N.-E. Sumatra in March, 1894.

673. ERIONOTA THRAX, Linnæus.

Snellen. Hagen. Distant. Very common everywhere throughout the year in ever following generations wherever species of wild or cultivated *Musa* (" Pisangs " in Malay, or Plantains) grow, on the leaves of which the larva feeds. The larva is white, covered with a white waxy powder, and has a black heart-shaped head. It lives in a shelter made of a portion of a rolled-up leaf. To make this shelter, it has to cut into the edge of one of the enormous leaves to obtain a suitable segment to be rolled up. The pupa is whitish, covered with the same white powder as is the larva, and is hidden from view in its dining room. This powder is of the greatest service to the animal, as in consequence of the heavy showers of rain of the tropics much water often collects in the rolled-up leaf, and the pupa if not so protected would soon be drowned and rot, as it is the powder keeps the pupa dry until the water has drained away or dried up. The butterfly emerges from the pupa in the early hours of the afternoon at 2 or 3 P.M., and is on the wing before sunrise and after sunset, and comes to the lights in the verandahs of houses. Even at the earliest dawn, between 4 and 5 A.M., Dr. Martin has noticed them flying round the plantain groves near his house. *E. thrax* often appears in large numbers, and then the caterpillars assist the south wind in giving the plantain leaves their usual torn and picturesque appearance ; but as the leaves are but little used except by the Madrasi Tamils, who utilize small perfect portions as plates when eating, the larvæ cause no loss to anyone.

674. ERIONOTA ATTINA, Hewitson.

Semper. Originally described from a female from " India" and Java. Its male is the *Unkana batara* of Distant. It is rare at low elevations throughout the year, at Bindjei and in the plains generally.

675. ERIONOTA SANGUINOCCULUS, Martin.

E. sanguinocculus, Martin, Einige neue Tagschmetterlinge von Nordost-Sumatra, (Munich), pt. 1, p. 5, n. 3 (1895).

Described from a unique male example taken in the forest near Selesseh in May. In Dr. Hagen's collection is a second male specimen.

676. **Gangara thyrsis**, Fabricius.

Hagen. Grose Smith. Semper. The giant of the *Hesperiidæ* of our area, and much rarer than *E. thrax*, Linnæus, but occurs throughout the year in places where *Calamus* grows, on which the white waxy-powdered downy larva feeds. The pupa is hidden in three rolled-up leaves, and is fixed by the extremity of the abdomen to a woven tripod in such a way that it can move in all directions. As soon as its shelter is touched it makes such a loud rattling noise that anyone would be at least startled or frightened on first hearing it. Like *E. thrax*, the butterfly emerges from the pupa late in the afternoon (from 3 to 5 o'clock P.M.), and flies after sunset.

677. **Paduka lebadea**, Hewitson.

Originally described from Borneo, but found in Ceylon (*subfasciata*, Moore), the Malay Peninsula (*glandulosa*, Distant), the Andaman Isles (var. *andamanica*, Wood-Mason and de Nicéville), N.-E. Sumatra, and Java. It is very rare in our area, in all the time Dr. Martin was in Sumatra he only obtained three specimens near the village of Selesseh in March and April.

678. **Kerana armatus**, Druce.

Found only at higher elevations, from Bekantschan to the Central Plateau, where it is fairly common and occurs throughout the year.

679. **Kerana gemmifer**, Butler.

Butler. Occurs from Selesseh to Bekantschan rather rarely throughout the year.

680. **Kerana diocles**, Moore.

Tagiades maura, Snellen, Midden-Sumatra, Lep., p. 28, n. 1 (1892).

Hagen as *maurus* [sic]. Grose Smith as *diocles*. Found commonly throughout the year from Selesseh to the Central Plateau. Flies near villages and houses, on roadsides and open places, never in the large forests.

681. **Kerana fulgur**, de Nicéville.

K. fulgur, de Nicéville, Journ. A. S. B., vol. lxiii, pt. 2, p. 55, n. 46, pl. i, fig. 6, *female* (1894); idem, id., Journ. Bomb. Nat. Hist. Soc., vol. ix, p. 383, n. 42, pl. Q, fig. 54, *male* (1895).

Occurs in Selesseh and in the outer hills rarely throughout the year. Dr. Martin and I obtained four pairs only.

682. **PIRDANA HYELA**, Hewitson.

Hagen. Originally described from Java, from whence I possess both sexes. Found also at Sungei Ujong in the Malay Peninsula. In this species the underside of both wings is striped with green along the veins, in *P. pavona*, de Nicéville, the underside is not thus marked. We possess only four specimens taken in Bekantschan in July and August.

683. **PIRDANA PAVONA**, de Nicéville, n. sp.

HABITAT: Perak in the Malay Peninsula; N.-E. Sumatra; Java.

EXPANSE: ♂, 1·85 to 2·25; ♀, 1·90 to 2·30 inches.

DESCRIPTION: MALE. UPPERSIDE, *both wings* glossy hair-brown. *Forewing* unmarked, the *cilia* brown. *Hindwing* unmarked, the *cilia* yellow, narrow anteriorly, wide posteriorly, and the yellow colour extending on to the wing membrane broadly at the anal angle. UNDERSIDE, *both wings* very dark verditer green. *Forewing* with the inner margin broadly as far as the median nervure and second median nervule dark ochreous, merging anteriorly into dark brown; the *cilia* pale brown. *Hindwing* unmarked, except that the anal angle is somewhat broadly brown anterior to the broad outer yellow area, which latter, together with the *cilia*, are as on the upperside. *Body* above dark brown. *Palpi* and *body* beneath with a small anal tuft yellow. FEMALE. UPPERSIDE, *both wings* glossy hair-brown. *Forewing* with the basal half glossed with deep shining steel bluish-green. *Hindwing* with the basal two-thirds glossed with the same colour; the yellow colour at the anal angle twice as broad as in the male. UNDERSIDE, *both wings* with the green ground-colour of a much paler shade than in the male. *Hindwing* with no brown area at the anal angle, the angle itself even more broadly yellow than on the upperside.

Allied to *Hesperia ismene*, Felder, from Celebes; *Hesperia hyela*, Hewitson, from the Malay Peninsula, Java and Sumatra; and *Pirdana rudolphii*, Elwes and de Nicéville, from Sikhim, the Khasi Hills and Tavoy in Lower Burma, but differing therefrom in the ground-colour of the underside being uniformly green, instead of dark brown with the green colour arranged in stripes along the veins.

Described from one male from Perak, a single male from the Battak mountains of N.-E. Sumatra taken in January, and a male and two females (the types) from Java, received without precise locality from Herr H. Fruhstorfer.

684. **PLASTINGIA CALLINEURA**, Felder.

Originally described from Java. *Hesperia latoia*, Hewitson, described from Singapore, is a synonym, as is also I believe *P. margherita*, Doherty, from Margherita and Sadiya in Upper Assam, and *P. fruhstorferi*, Snellen, from Java. *P. callineura* appears to be a very variable species not only in colouring but also in size, as our specimens measure in expanse of wings from 1·15 to 1·75 inches. In Sumatra it is common in the forests of the outer hills south of Namoe Ockor throughout the year. It settles with folded wings. It requires a skilled eye to distinguish it when at rest from common species of *Padraona* or *Telicota*.

685. PLASTINGIA HELENA, Butler.

Hagen. Is much rarer than the last-named species, but occurs throughout the year from Selesseh to Bekantschan.

686. PLASTINGIA VERMICULATA, Hewitson.

P. vermiculata, de Nicéville, Journ. A. S. B., vol. lxiii, pt. 2, p. 56, n. 47, pl. v, fig. 15, *male* (1894).

Hewitson. Grose Smith. Originally described from Sumatra; occurs in the Battak mountains near Bekantschan in July rarely, only two or three specimens obtained.

687. PLASTINGIA TESSELLATA, Hewitson.

Originally described from Macassar in Celebes. The markings of the underside are stated to be "yellow." The "*Hesperia*" *eulepis* of Felder, described also from Celebes, is said to have the markings on the underside "ochraceo-sulphureis," and is almost certainly a synonym. The next-named species is given by Captain Watson as a synonym also, but it has the markings of the underside "pure silvery white." I believe it to be distinct. *P. tessellata* is very rare, two or three specimens only have been taken near Bekantschan in July.

688. PLASTINGIA NAGA, de Nicéville.

Hesperia ? naga, de Nicéville, Journ. A. S. B., vol. lii, pt. 2, p. 89, n. 37, pl. x, fig. 2, *female* (1883).

Occurs at Sibsagar in Upper Assam, Singapore, N.-E. Sumatra, and Java. Not less rare than the two foregoing species, four or five specimens only obtained in March, June and December. Dr. Martin caught it himself commonly in Singapore in February, 1895.

689. LOTONGUS CALATHUS, Hewitson.

Hewitson. Hagen. Grose Smith. Distant. Snellen. Kirby. Originally described from Sumatra. I possess specimens from the

Daunat Range in Middle Tenasserim, Burma, and from Java. It is very rare in our area, a few specimens only have been obtained in March and May on the outer hills. It is probable that the "*Hesperia*" *traviata* of Plötz (see No. 756) is a synonym of this species. "*Eudamus*" *calathus* is nowhere mentioned by Plötz, and appears to have been unknown to him.

690. LOTONGUS SCHÆDIA, Hewitson.

L. maculatus, Distant, Rhop. Malay., p. 372, n. 2, pl. xxxv, fig. 1, *male* (1886).

Hewitson. Grose Smith as *schœdia* [sic]. Kirby. Originally described from Sumatra. Distant described it from Malacca. I possess specimens from Perak in the Malay Peninsula. The *Lotongus parthenope*, Weymer (de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. vii, p. 354, n. 22, pl. J, figs. 4, *male*; 5, *female* (1892), is quite distinct from this species, still more so from *L. calathus*, Hewitson. *L. schædia* is commoner in Sumatra than *L. calathus*, but is always somewhat scarce, and occurs throughout the year from Selesseh to Namoe Oekor and on the outer hills. Dr. Martin caught it fairly commonly in February, 1895, on the small Dutch island of Riouw near Singapore.

691. *LOTONGUS AVESTA, Hewitson.

L. avesta, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. ix, p. 383, n. 43, pl. Q, fig. 56, *female* (1895).

Hewitson. Grose Smith. Kirby. Originally described from Sumatra. Mr. H. J. Elwes has specimens from Pulo Laut near Borneo, and I have a single female example from the Ataran Valley, Tenasserim, Burma.

692. LOTONGUS EXCELLENS, Staudinger.

Proteides excellens, Staudinger, Iris, vol. ii, p. 141, pl. ii, fig. 6, *male* (1889).

Originally described from Palawan in the Philippine Isles. Superficially it reminds one instantly of *Hasora* (*Parata*) *chuza*, Hewitson. It is very rare at high elevations south of Bekantschan, only four specimens were obtained in March and August of the last year of Dr. Martin's residence in Sumatra.

693. ZELA ZEUS, de Nicéville.

Z. zeus, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. ix, p. 388, n. 44, pl. Q, fig. 57, *male* (1895).

Occurs rarely at Selesseh and in the Battak mountains in May. The type is from Pulo Laut near Borneo.

694. HIDARI IRAVA, Moore.

Hagen. Grose Smith. Staudinger. Snellen. Very common and occurs throughout the year in ever following generations everywhere where the cocoa-nut palm grows, on the leaves of which the larva feeds together with *Amathusia phidippus*, Johanssen (*vide ante*, p. 393). The female always lays her eggs on young leaves, and the larvæ are sometimes so abundant as to do appreciable damage to the palms by devouring all the leaves. The larva is of a dirty green colour with subdorsal black stripes and an ochreous head, and is hidden from view between two leaves of the food-plant woven together. The pupa is reddish-brown. The butterflies are on the wing early in the morning and after sunset, and often come to the lighted lamps. In the daytime they rest with folded wings in dark places near houses. Once in 1892 all the cocoa-nut trees near the Manager's house at Namoe Oekor were eaten up by the larvæ, and later hundreds of the butterflies took shelter during the day in the house. None of them rested on the white-washed walls, but all on the dark curtains and portières.

695. HIDARI DOESOENA, Martin.

H. doesoena, Martin, Einige neue Tagschmetterlinge von Nordost-Sumatra, pt. 1, (Munich), p. 6, n. 4 (1895).

The name given to this species by Dr. Martin is Dutch, and is pronounced *dusuna* not *desena*. It has been described from six males only taken in August near Bekantschân.

696. *HIDARI HARMACHIS, Hewitson.

Astictopterus harmachis, Hewitson, Ann. and Mag. of Nat. Hist., fifth series, vol. i, p. 341 (1878).
Hidari staudingeri, Distant, Rhop. Malay., p. 395, n. 3, pl. xxxv, fig. 25 (1886).

Hewitson. Grose Smith. Hewitson described this species from a specimen in his collection from Sumatra, and referred to another in Dr. Staudinger's collection from Malacca. Mr. Distant described it as a "new species" from a Malaccan specimen, also in Dr. Staudinger's collection, probably the one Hewitson referred to. Distant also referred to *Astictopterus* ? *harmachis*, but failed to recognise it (l. c., p. 404). We have not seen this species.

697. EETION ELIA, Hewitson.

E. elia, de Nicéville, Journ. Bomb. Nat. Hist. Soc. vol. ix, p. 396, n. 1 (1895).

Hewitson. Grose Smith. Butler. Kirby. Distant. Originally described from Sumatra, where it occurs in our area at Selesseh and on the outer hills from May to August.

698. **Etion martini**, Distant.

Zea martini, Distant, Ann. and Mag. of Nat. Hist., fifth series, vol. xix, p. 274, n. 187 (1887).

Originally described from Northern Borneo. In our area it occurs rarely at Selesseh, Namoo Oekor, and on the outer hills in April, July, August, October and November. It has a rapid flight, and when flying appears to be entirely white.

699. **Pithauria** (*Pithauriopsis*) **aitchisoni**, Wood-Mason and de Nicéville.

Pithauriopsis aitchinsoni, Wood-Mason and de Nicéville, Journ. A. S. B., vol. lv, pt. 2, p. 387, n. 233, pl. xv, fig. 4, *male* (1886).

Originally described from Cachar; it is common in the forests of Middle Tenasserim, Burma, where I have taken it sucking up moisture on the banks of streams in October. It is found also in Java and N.-E. Sumatra, where it flies throughout the year somewhat scarcely on the outer hills.

700. **Notocrypta feisthamelii**, Boisduval.

Snellen. Staudinger as *alysos*. Captain Watson gives the "*Plesioneura*" *alysos* of Moore as a synonym of this species. Common all over our area throughout the year in shady grassy places in or near forest.

701. **Notocrypta restricta**, Moore.

Found always with the last-named species, but is somewhat rarer.

702. **Notocrypta monteithi**, Wood-Mason and de Nicéville.

Plesioneura monteithi, Wood-Mason and de Nicéville, Journ. A. S. B., vol. lv, pt. 2, p. 391, n. 245, pl. xviii, figs. 3, 3*a*, *female* (1886).

Originally described from Cachar. It is exceedingly rare, I possess a single female example from Sumatra.

703. ***Notocrypta albifascia**, Moore.

Hagen as *albofascia* [sic]. Originally described from Hatsiega, Tenasserim, Burma. It is probable that Dr. Hagen identified the last-named species under this name, as the two are very closely allied.

704. **Notocrypta neæra**, de Nicéville.

N. neæra, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. vi, p. 379, n. 25, pl. G, fig. 27, *female* (1891).

Originally described from Perak in the Malay Peninsula, occurs also in Tenasserim, Burma. It is very rare in our area, only two specimens having been obtained from the higher mountains in March.

705. UDASPES FOLUS, Cramer.

Hagen as *folus*, Fabricius [sic]. Grose Smith. Common and ubiquitous throughout the year in gardens and on grassy places and roadsides; never in forest.

706. GEHENNA GRÆÆ, de Nicéville.

G. grææ, de Nicéville, Journ. Bomb. Nat. Hist. Soc, vol. ix, p. 399, n. 47, pl. Q, fig. 59, *male* (1895).

Described from a unique male taken on 23rd January, 1893, at Namoe Oekor.

707. CUPITHA PURREEA, Moore.

Very rare in the forest near Selesseh, only four specimens obtained in May.

708. TELICOTA AUGIAS, Linnæus.

T. augias, Wood-Mason and de Nicéville, Journ. A. S. B., vol. lv, pt. 2, p. 384, n. 224, pl. xvii, fig. 1, *male* (1886).

Snellen. Hagen. Distant.

709. TELICOTA BAMBUSÆ, Moore.

Hagen. Both the species of *Telicota* are common in the plains throughout the year, and are very fond of flowers.

710. PADRAONA DARA, Kollar.

Grose Smith as *mœsa* [sic]. There is little doubt I think that "*Pamphila*" *mæsa*, Moore, is a synonym of "*Hesperia*" *dara*, Kollar. It is more than probable that several species are included under this name. Nearly everywhere where the genus is found, individuals are very numerous, and these to a certain extent can be superficially sorted into apparently distinct species by size and colour, but until the prehensores of the males of a large number of specimens from various localities have been carefully, critically and exhaustively studied, there does not appear to be much hope of correct specific diagnosis. *P. dara* is the commonest and most ubiquitous of the *Hesperiidæ* in our area, and flies all the year round.

711. *PADRAONA MÆSOIDES, Butler.

Hagen. Originally described from Malacca. I have never been able to recognise it with any degree of certainty.

712. ***PADRAONA SUNIAS**, Felder.

Snellen. Hagen. Originally described from Amboina, but has never been figured.

713. **PADRAONA PAVOR**, de Nicéville.

P. pavor, de Nicéville, Journ. A. S. B., vol. lxiii, pt. 2, p. 53, n. 44, pl. iv, fig. 8, *male* (1894).

Found only at high elevations throughout the year on the Central Plateau, not below 3,000 feet elevation, where it is as common as *P. dara*, Kollar, is in the plains.

714. **PADRAONA GOLA**, Moore.

Much rarer than *P. dara*, Kollar, but occurs all over our area and throughout the year in the plains.

715. **PADRAONA PARAGOLA**, de Nicéville, n. sp.

HABITAT: N.-E. Sumatra.

EXPANSE: ♂, ♀, 1·1 inches.

DESCRIPTION: MALE. UPPERSIDE, *both wings* fuscous, with rich ochreous markings. *Forewing* with the base (especially towards the costa) irrorated with golden-coloured scales; a broad oblique discal band from the inner margin near the base of the wing almost to the costa towards the apex of the wing, crossed by the black veins, on the side facing the costa anteriorly with a very irregular, posteriorly with an even, edge, the side facing the outer margin with an even edge; anteriorly at the end of the discoidal cell indented with a tooth of the fuscous ground-colour; the band is narrow at both ends, broad in the middle. *Hindwing* with a large oval patch occupying the middle of the wing not reaching the costa or the abdominal margin; the base thickly clothed with long golden-coloured setæ. UNDERSIDE, *forewing* black, irrorated throughout, except the basal portion broadly of the inner margin, with golden-coloured scales; the discal band as on the upperside; a somewhat narrow marginal golden-coloured band, broadest at the costa, narrowing posteriorly, not quite reaching the inner angle of the wing; an anteciliary fine black line. *Hindwing* black, heavily irrorated throughout with golden-coloured scales; the discal oval patch as on the upperside, but bearing anteriorly at the end of the discoidal cell a small black spot; a narrow marginal golden-coloured line, and an anteciliary fine black line. *Cilia* throughout golden-coloured, broad on the hindwing, somewhat infuscated anteriorly in the forewing. *Head* and *body* black, but thickly clothed with ochreous setæ. *Antennæ* anteriorly black, posteriorly annulated with yellow, the thick portion of the club beneath entirely yellow. FEMALE. UPPERSIDE, *both wings* with the ground-colour and markings duller, the latter narrower, than in the male. *Forewing* with no golden-coloured irrorations at the base of the wing. UNDERSIDE, *both wings* duller coloured throughout than in the male, the discal patch on the hindwing distinctly whitish.

Nearest to "*Pamphila*" *gola,* Moore, described and figured from Port Blair in the South Andaman Isles. A synonym of this species is *Padraona goloides,* Moore, described and figured from Ceylon. I have carefully compared specimens of these two species from the above-named islands, and find that the differences relied on by Mr. Moore to separate them are absolutely inconstant. The following are recorded localities for *P. gola* :—Port Blair, South Andamans; Mergui; Thaing, King Island (Mergui Archipelago) (*Moore*); Silcuri (Cachar) (*Wood-Mason* and *de Nicéville*); Sumba; Sambawa (*Doherty*); Buxa (Bhutan) (*Elwes*); Kiukiang (Central China) (*Leech*); Sikhim (*de Nicéville*); Nilgiri District (*Hampson*); and I possess specimens from the following hitherto unrecorded localities;—Calcutta; Orissa; Travancore; Perak (Malay Peninsula); N.-E. Sumatra; Nias; Java; S.-E. Borneo; and Celebes. *P. goloides* has been recorded from Ceylon by Moore, and from Singapore and Java by Distant. "*Pamphila*" *naranata,* Moore, is a MS. name for *P. goloides* in Horsfield and Moore's Cat. Lep. Mus. E. I. C., vol. i, p. 251, n. 565 (1857), and was recorded from Java. I have been informed by Mr. G. F. Hampson that *Pamphila augustula,* Herrich-Schäffer, from Cape York (Northern Australia) and the Fiji Islands is another synonym. Dr. Staudinger also records a "*Pamphila*" *goloides,* Moore, var. *akar,* Mabille, from Palawan (Iris, vol. ii, p. 146 (1889), which may be another synonym. *P. paragola* differs from *P. gola* on the upperside of the hindwing in having the discal patch broader in the middle thereby causing it to be oval instead of lengthened or band-like in shape; this feature is especially marked on the underside. The golden irroration of the underside almost throughout is peculiar to *P. paragola.* There are other smaller differences which are very obvious when specimens of the two species are compared side by side, but are difficult to express in words. I hope to figure *P. paragola* shortly.

Described from two males and one female in my collection.

716. PADRAONA PALMARUM, Moore.

Very rare, but every year Dr. Martin caught a few specimens round his house at Bindjei in the plains in July.

717. HALPE HOMOLEA, Hewitson.

Originally described from Singapore. Occurs in Sumatra somewhat rarely on the outer hills from May to August.

718. HALPE ZEMA, Hewitson.

Grose Smith. The "*Hesperia*" *ormenes*, Weymer, Stet. Ent. Zeit., vol. xlviii, p. 16, n. 14, pl. ii, fig. 6, *male* (1887), from Nias, is a synonym of this species. Also rare, occurs from Selesseh to Bekantschan in March, July and November.

719. HALPE INSIGNIS, Distant.

Originally described from Singapore. It is a true *Halpe*, Mr. Distant placed it in the genus *Baoris* with a query. . Excessively rare, Dr. Martin took a single male in August near Tandjong Djatti.

720. HALPE HIERON, de Nicéville.

H. hieron, de Nicéville, Journ. A. S. B., vol. lxiii, pt. 2, p. 54, n. 45, pl. iv, fig. 1, *male* (1894).

Hitherto only recorded from N.-E. Sumatra, where it occurs only at high elevations not below 3,000 feet to the south of Bekantschan. In suitable localities it is not rare, we have specimens taken in February, April and August.

721. *HALPE BETURIA, Hewitson.

Snellen. Captain Watson states that *H. beturia* is confined to Celebes, and he described the Indian, Burmese, and Andamanese form as *H. moorei*. It is probable that the Sumatran species should be known by the latter name. We did not obtain it.

722. *HALPE MARSENA, Hewitson.

Hewitson. Grose Smith. Kirby. Originally described from Sumatra. It is very close to, if not identical with, "*Hesperia*" *ornata*, Felder, described from Java, but occurring also in Cachar, *vide* Wood-Mason and de Nicéville, Journ. A. S. B., vol. lv, pt. ii, p. 382, n. 214, pl. xviii, figs. 7, 7*a*, *male* (1886). Hewitson's name has priority by one year.

723. ITON SEMAMORA, Moore.

I. semamora, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. ix, p. 401, n. i (1895).

**Hesperia barea*, Hewitson, Trans. Ent. Soc. Lond., third series, vol. ii, p. 490, n. 12 (1866).

Hewitson. Kirby. Hewitson described this species from Sumatra under the name of "*Hesperia*" *barea*. It occurs from Namoe Ockor to Bekantschan and in the Battak mountains in March, July and August.

724. BAORIS OCEIA, Hewitson.

Very rare, only a few male specimens taken near Bekantschan in March.

725. BAORIS (*Chapra*) MATHIAS, Fabricius.

. Snellen as *julianus*, Fabricius [sic], and *julianus*, Latrielle. Hagen as *mathias* and *julianus*. Butler as *julianus*. The "*Hesperia*" *julianus* of Latreille was described from Java, and appears to be a synonym of "*Hesperia*" *mathias*, Fabricius. This widely-distributed butterfly is very common throughout the year in the plains of Sumatra, especially so near Mabar.

726. BAORIS (*Chapra*) BRUNNEA, Snellen.

Chapra care, de Nicéville, Journ. Bomb Nat Hist. Soc., vol vi, p. 388, n. 81, pl. G, fig. 33, *male* (1891).

When describing this species from Burma, I overlooked Heer P. C. T. Snellen's description and figure of the species from Java. In Sumatra it is rare from Bindjei to Bekantschan in March, and again in October and November.

727. BAORIS (*Parnara*) CONJUNCTA, Herrich-Schäffer.

Hagen. This is the "*Hesperia*" *narooa* of Moore, the "*Gegenes*" *javana* of Mabille, and the "*Hesperia*" *alice* of Plötz, the latter described from Mergui and the Philippines, of which Herr Gustav Weymer has been so good as to send me a beautiful coloured drawing of the type, which is a male, now in the Berlin Museum. It occurs commonly over the whole of our area and throughout the year.

728. BAORIS (*Parnara*) TOONA, Moore.

I am unable to follow Mr. J. H. Leech in placing this species as a synonym of "*Pamphila*" *pellucida*, Murray, specimens of the latter species in my collection from Japan, from whence it was described, appear to me to be quite distinct from "*Hesperia*" *toona*. The upperside of both wings in fresh specimens of *B. toona* is rich ochreous, which it never is in *B. guttatus*, Bremer and Grey = "*Pamphila*" *mangala* Moore. *B. toona* has been figured and described by Mr. Distant in Rhop. Malay., p. 380, n. 3, pl. xxxiv, fig. 9 (1886) as *Baoris chaya*, Moore, a species which belongs to the *Chapra* section of the genus. Hitherto unrecorded localities for the species are Trevandrum in South India, Java, and Celebes. In N.-E. Sumatra it is as ubiquitous as the last-named species.

729. BAORIS (*Parnara*) CAHIRA, Moore.

Originally described from the South Andaman Isles. It has two spots in the discoidal cell and four on the disc of the forewing. I have specimens from Sumatra which agree with Mr. Moore's figure and description of the species. I have specimens also from Sumatra which agree with Mr. Moore's description and Mr. Elwes' woodcut of *Baoris austeni*, described from Assam, which also has two spots in the discoidal cell and five on the disc of the forewing. Again, I have other specimens from Sumatra agreeing with Mr. Moore's description of "*Hesperia*" *moolata*, described from Upper Tenasserim in Burma, which has one spot in the discoidal cell and also five on the disc of the forewing. Lastly, I have specimens from Sumatra agreeing with Mr. Moore's figure and description of "*Hesperia*" *kumara*, originally described from Canara in South India, recorded also from Mergui in Lower Burma and Ceylon by the author. It has no spots in the discoidal cell, but there are seven discal spots on the forewing. As all my Sumatran specimens appear to me to represent one and the same species, I record them under the oldest of Mr. Moore's four names. It may, however, be subsequently found on an examination of the prehensores of the male that some of these species may be valid. In Sumatra *B. cahira* is found at Bindjei and Namoe Oekor in the plains, but is much rarer than the two foregoing species, but flies throughout the year.

730. BAORIS (*Parnara*) BADA, Moore.

Pamphila apostata, Snellen, Midden-Sumatra, Lep., p. 27, n. 1 (1892).

"*Hesperia*" *bada*, Moore, was originally described from Ceylon and Malacca, and is figured in "The Lepidoptera of Ceylon" by the author. It has typically no spots in the discoidal cell of the forewing. Mr. Elwes says that "*Pamphila*" [sic] *mangala*, Moore, and "*Hesperia*" *bada*, Moore, as well as "*Pamphila*" [sic] *fortunei*, Felder, originally described from Shanghai in China, are synonyms of "*Eudamus*" *guttatus*, Bremer and Grey, originally described from North China. In this I do not entirely agree with him, as I consider *H. bada* and *H. fortunei* to be distinct. Mr. Leech gives *H. fortunei* as a synonym of *E. guttatus*, and omits *P. mangala* and *H. bada*. I agree with him in so far as to consider *P. mangala* to be synonymous with *E. guttatus*; the latter is, however, larger than (1·5 inches as against ♂, 1·2; ♀, 1·3 inches), and has a different facies to, *H. bada*. Leech says that *Parnara guttata* "Can be easily distinguished from *P. pellucida*, [Murray, originally described from Japan] by its longer, narrower wings, and by the spots of the hindwing, which are almost in a straight line, while in *P. pellucida* the arrangement is alternate." I have specimens of *P. pellucida* from Western China identified by Mr. Leech, and which agree with Mr. H. Pryer's figure of the species in "Rhopalocera Nihonica," pl. x, n. 11, *female*, also with Dr. O. Staudinger's figure in Romanoff's "Mémoires sur les Lépidoptères," vol. iii, pl. viii, fig. 3, *male*, which further differ from *E. guttatus* in the forewing in the lowest of the three subapical spots being moved outwards towards the margin instead of being directly under the other two; the spots in the discoidal cell are larger and not placed immediately above one another but obliquely; and, lastly, the antennæ are absolutely different, the shaft being half as long again as in *E. guttatus*, and the club elongated instead of being short and compressed. The differences in markings may perhaps be considered to be trivial unless shewn to be constant in a long series, but the difference in the antennæ must be specific. But Leech gives "*Hesperia*" *toona*, Moore, as a synonym of *P. pellucida*, which is, I think, incorrect. Watson gives *H. bada* as a distinct species, and places *P. mangala* as a synonym of *P. guttatus*. In this I agree with him. *H. fortunei* is probably distinct, though placed by Leech as a synonym of *E. guttatus*, as noted above. As figured in "Reise Novara," Lepidoptera, pl. lxxii, fig. 11, *male*, it has the antennæ as long as *P. pellucida*, but differs from that species in having no spots in the discoidal cell of the forewing, and the discal spots of the hindwing arranged in a straight line instead of being placed alternately. I would arrange all these names thus:—

1. *Baoris* (*Parnara*) *toona*, Moore, from the Himalayas, Bhutan, Assam, Burma, the Malay Peninsula, South India, Sumatra, Java, and Celebes.

2. *Baoris* (*Parnara*) *fortunei*, Felder, from Shanghai.

3. *Baoris* (*Parnara*) *pellucida*, Murray, from Japan and Western China.

4. *Baoris* (*Parnara*) *guttatus*, Bremer and Grey.

Pamphila mangala, Moore, from the Western Himalayas, China, and Japan.

5. *Baoris* (*Parnara*) *bada*, Moore.

Pamphila apostata, Snellen, from nearly the whole of India, Ceylon, Burma, Sumatra, and Java.

In *B. toona* there are always two spots in the discoidal cell of the forewing, usually conjoined. In *B. guttatus*, of which I have a good series from the Western Himalayas, Western and Central China, and Japan, there is sometimes a minute spot in the cell (probably this spot is occasionally absent altogether), or two spots, variable in size, but never conjoined. In *B. bada*, there are sometimes no spots, one, or two spots, never conjoined. This is the smallest and darkest-coloured species of the three. In Sumatra it is somewhat rarer than *B. cahira*, Moore, but occurs throughout the year from Bindjei to the outer hills.

731. BAORIS (*Parnara*) COLACA, Moore.

Originally described from the South Andaman Isles, and figured by Moore and Elwes. It differs from *B. bada*, Moore, in being smaller, with smaller spots on the hindwing, which are also slightly differently arranged. Occurs rarely on the outer hills in November.

732. BAORIS (*Parnara*) PUGNANS, de Nicéville.

Parnara pugnans, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. vi, p. 384, n. 28, pl. G, fig. 30, *female* (1891).

Originally described from the Malay Peninsula and Nias Island; in Sumatra it occurs at Selesseh, Namoe Oekor, and in the Battak mountains from July to October. It is found also in the island of Pulo Laut.

733. *BAORIS (*Parnara*) CINNARA, Wallace.

Grose Smith. Originally described from Formosa. The description is quite inadequate, and from it the species cannot be identified with certainty.

734. ISMENE ŒDIPODEA, Swainson.

Rare at high elevations south of Bekantschan in June and September.

735. ISMENE ETELKA, Hewitson.

Originally described from Sarawak in Borneo; occurs also in the Ataran Valley, Tenasserim, Burma. The species was described from a female, and is named *Ismene itelka* on the plate. In Sumatra it is very rare at higher elevations near Bekantschan. Three specimens only obtained, one each in March, July, and August.

736. ISMENE HARISA, Moore.

Somewhat rare throughout the year at high elevations from Bekantschan to the Central Plateau. This species was very common, however, in February, 1895, in Indragiri in the plains.

737. *ISMENE STRIATA, Hewitson.

Snellen. Originally described from China.

738. ISMENE RADIOSA, Plötz.

I. radiosa, Plötz, Berl. Ent. Zeitsch., vol. xxix, p. 232, n. 35 (1885); idem, id., Stet. Ent. Zeitsch., vol. xlvii, p 114, n. 26 (1886).

Originally described from Celebes. My identification is based on specimens of this species sent to me so named by Heer M. C. Piepers from Java. A unique example has been obtained in Sumatra near Bekantschan in March.

739. ISMENE sp.

Dr. Martin informs me that his brother obtained three male specimens in Indragiri of an *Ismene* allied to *I. iluska*, Hewitson, *I. mahintha*, Moore, *I. antigone*, Röber, and *I. ionis*, de Nicéville. As I have not seen a specimen from Sumatra I cannot determine the species.

740. HASORA BADRA, Moore.

Hagen. Grose Smith. Common in the plains, most plentiful in April.

741. HASORA HADRIA, de Nicéville.

H. hadria, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. iv, p. 172, n. 10 (1889).

Common in the outer hills and near Selesseh in April, May, September and December.

742. HASORA CHABRONA, Plötz.

H. chabrona, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. ix, p. 406, n. 51 (1895).

Rarer than the two foregoing species, occurs near Selesseh and on the outer hills in April and September.

743. HASORA MYRA, Hewitson.

Originally described from Java. Occurs in Sumatra throughout the year at high elevations not below 3,000 feet, but never commonly.

744. HASORA (*Parata*) CHROMUS, Cramer.

Common on the outer hills in May and June.

745. HASORA (*Parata*) SIMPLICISSIMA, Mabille.

H. (*Parata*) *simplicissima*, de Nicéville, Journ. Bomb. Nat. Hist. Soc., vol. ix, p. 405, n. 50, pl. Q, figs. 62, *male*; 63, *female* (1895).

Occurs not rarely throughout the year at low elevations, in the plains near Selesseh and at Tandjong Djatti.

746. * HASORA (*Parata*) MALAYANA, Felder.

Snellen. Originally described from the Malay Peninsula.

747. HASORA (*Parata*) CELÆNUS, Cramer.

Originally described from Amboina. Rare, found from Selesseh to Bekantschan in January and March.

748. HASORA (*Parata*) CHUZA, Hewitson.

Hagen. Originally described from Sarawak in Borneo. In N.-E. Sumatra it occurs at Selesseh, and on the Battak mountains from Bekantschan to the Central Plateau fairly commonly throughout the year.

749. BIBASIS SENA, Moore.

Flies throughout the year near Selesseh and on the outer hills, most plentiful in April.

750. BADAMIA EXCLAMATIONIS, Fabricius.

Throughout the year in the plains at Selesseh, and on the outer hills near Paya Bakong. The males come to wet spots on roads, where they settle with widely spread wings Dr. Martin notes. Mr. G. C. Dudgeon has recently described the transformations of this species from Bhutan in N.-E. India, in the Journal of the Bombay Natural History Society, vol. x, p. 144 (1895).

751. RHOPALOCAMPTA CRAWFURDI, Distant.

Hagen as *benjamini*. Occurs throughout the year at Selesseh and on the outer hills from Namoe Oekor to Bekantschan and south of that place. Herr O. Puttfarcken once found a larva of this species, and described it as follows:—"Has the typical shape of the larvæ of the *Hesperiidæ*, and is like that of *Erionota thrax*, Linnæus. It lived in a rolled-up leaf, is dark velvety blue with white transverse lines, head and legs yellow, head with three black spots arranged in a triangle."

The following species have been recorded from Sumatra by various authors, but we have not been able to identify them.

752. * TAGIADES SATAMPA.

Hagen. He does not give the name of the describer of this species as he usually does. We are unable to trace it. It is possible that he means the well-known hesperid genus *Satarupa*, Moore, which occurs in Sumatra, and is not mentioned by him, though he records *Satarupa sambara*, Moore, from Sumatra, under the name of *Tagiades sambara*.

753. *ISOTEINON PERTINAX.

Grose Smith. There is a "*Papilio*" *pertinax*, Stoll, described from Surinam in South America, which is placed by Kirby as a synonym of *Telegonus pervivax*, Hübner. From the figure I cannot find that it resembles any oriental hesperid. There is also a "*Papilio*" *pertinax*, Sepp, from Surinam, which has been re-named *Pamphila schelleri* by Kirby. The book in which it is described and figured is not available to me. Furthermore, there is a "*Papilio*" *pertinax* of Cramer, described from Surinam, which name stands. This species is the type of the genus *Phlebodes*, Hübner.

754. *ISOTEINON MERJA.

Grose Smith. I am unable to trace this species, and Mr. Grose Smith does not say by whom it was described.

755. *PAMPHILA FETTINGI, Möschler.

P. fettingi, Moschler, Verh. zool-bot. Gesellsch. Wien, vol. xxviii, p. 219, n. 26 (1879).

Originally described from males from Sumatra. From the description it appears to be closely allied to *Padraona pavor*, de Nicéville (*vide* No. 713 *ante*).

756. *HESPERIA TRAVIATA, Plötz.

H. traviata, Plotz, Stet. Ent. Zeit., vol xlvii, p. 91, n. 75c (1886).

Originally described from Sumatra. It is compared with *Lotongus parthenope*, Weymer, and from the description probably belongs to that genus (*vide* No 689 *ante*).